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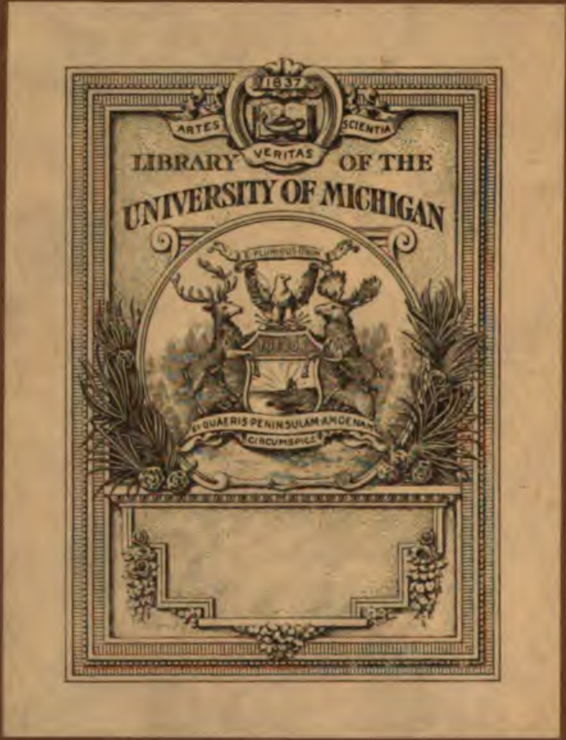
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PHARMACEUTICAL JOURNAL

AND

TRANSACTIONS.

VOLUME X.

1850–51.

EDITED BY

JACOB BELL.

LONDON:
JOHN CHURCHILL,
PRINCES STREET, SOHO;
MACLACHLAN & STEWART, EDINBURGH; AND FANNIN & CO., DUBLIN.

1851.

ACEUTICAL JOURNAL

AND

RANSACTIONS.

VOLUME X

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[illegible]OB BELL

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THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. I.—JULY 1st, 1850.

MEDICAL AND PHARMACEUTICAL LEGISLATION.

"There is no disputing the fact that the cause of Medical Reform is at this moment in the greatest peril. It must also be confessed that the dissensions of the profession have produced this sad result."—*Lancet*.

This aphorism correctly describes the usual state of the medical reform barometer during the months of June and July, and its actual condition at the present time. It is discouraging to see the advocates of Medical Reform wasting their labour by travelling over the same ground again and again—acting the same farce year after year, and leaving off at the close of each session exactly where they began.

The editor of the *Lancet* has lately propounded a scheme (June 8th) for taking the sense of the profession by the issue of voting papers, containing two questions. 1st, Whether the Charter of the Royal College of Surgeons of England should be so amended as to admit Practitioners in Medicine, Surgery, and Midwifery, to seats in the Council of that College on the principle of representation? or, 2nd, Whether the Practitioners in Medicine, Surgery, and Midwifery, should be incorporated in an independent College, on the principle of representation? these papers being returned by the readers of the *Lancet* with the words "Yes" or "No," as the case may be, appended to each question; the documents thus collected are taken by the editor to represent the sentiments of THE PROFESSION, and to furnish the key to the enigma, the solution of which has hitherto baffled all the efforts of medical legislators. Now, it was decided the year before last, that the establishment of the new college alluded to in the second question was undesirable: and this decision was confirmed last year by the common consent of the several medical bodies and associations. It has also been decided and confirmed that the conversion of the College of Surgeons into a College of General Practitioners, implied in the first question, was equally undesirable. The reiteration of these worn-out questions, which are already discussed *usque ad nauseam*, settled and dismissed, can lead to no useful result. Such a proceeding is termed in figurative language "riding a dead horse," which is the antithesis of locomotion.

Moreover there is in the first question more than meets the eye. The editor of the *Medical Gazette* directs attention to the fact that the Council of the College of Surgeons have already assented to the desired concession in favour of "Practitioners in Medicine, Surgery, and Midwifery," who have ceased to practise Pharmacy for a period of five years, such parties being eligible to the fellowship, and therefore to the council. "The alternative," he observes, "is not fairly put: it is the pharmaceutical practice which constitutes the great objection to admission on the part of the College; and we really believe that the majority of the profession would put a *veto* upon the proposed foundation of a new college, if no better argument could be adduced in its favour, than that the Royal College of Surgeons refused to admit to its Council those among its members who practised Pharmacy."*

What would be said of the Pharmaceutical Society if Surgeons were admitted on its Council? This would be quite as rational as the election of dealers in jalap and rhubarb on the Council of the College of Surgeons.

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* *Medical Gazette*, June 14, p. 1081.

In the *Lancet*, of June the 15th, the questions are altered and condensed as follows:—1. Shall there be a reformed College of Surgeons, so as to represent the interests of the general practitioners?—2. Shall there be a new incorporation for that body? In the absence of a definition of the term "reformed College of Surgeons," the answers to these questions cannot by possibility lead to any practical result. For whether the first or the second question be answered in the affirmative, the profession would still be at sea as to the nature of the reform required, or the nature of the incorporation to be obtained. This has been forcibly pointed out in the *Medical Gazette*.

In all these and similar questions the real object of medical reform is thrown aside. The protection of the profession and the public against the inroads of quacks and impostors is disregarded, and the movement merges into an unworthy struggle and contention among the members of the profession itself.

Well may the editor of the *Lancet* say that "the cause of Medical Reform is at this moment in the greatest possible peril," and attribute the fact to the "dissensions in the profession!" Does he sincerely desire to see the question settled, or is he ambitious to be characterised as the Daniel O'Connell of the profession—the perpetual agitator—the advocate of the impossible—and the undertaker of that which he will never perform? If the attainment of Medical Reform is to be delayed until drug vendors are eligible on the council of the College of Surgeons, and until the several grades and divisions in the profession are merged into one (as they were anterior to the time of Henry VIII.) then we may despair of seeing any reform whatever, and congratulate the profession if it should escape from the threatened retrograde movement. But we are told that Pharmaceutical legislation must remain in abeyance until the medical disputes are settled; or, on the *Lancet* hypothesis, until Pharmacy is adopted and safely installed in Lincoln's Inn Fields! We presume the next step would be to admit Surgery at Bloomsbury Square. This being absurd, the hypothesis falls to the ground, and we revert to the common-sense view of the subject, maintaining, as we have always done, that Surgery and Pharmacy being two distinct branches of the profession, must be represented by, and cultivated in, two separate institutions. These institutions have not and ought not to have any official connection; and it remains to be shown why the one should be altogether deprived of legislation because dissensions unhappily prevail in the other.

The Secretary of State is at this time engaged in preparing a bill for regulating the sale of poisons; and such a bill, unless it embrace the entire subject of Pharmacy, would be a delusion and a snare. But the voice of the public demands the interference of the Secretary of State in reference to poisons, therefore there is no alternative but to introduce a Pharmaceutical bill, irrespective of surgical dissensions, medical O'Connells, and perpetual agitators.

The proceedings above alluded to in the medical profession, having afforded abundant evidence of the fatal result of disunity among those who ought to be co-operating in a common cause, we trust the members of our body will profit by this experience. Fortunately the cause of Pharmaceutical Reform is not endangered by disagreements among ourselves, but the progress of legislation in this department has been delayed by the unwillingness of the Secretary of State to undertake it. We hope this hesitation on his part will shortly be overcome, feeling fully convinced that the Pharmaceutical portion of the Medical Reform question could be carried without difficulty, if introduced, as it ought to be, under the auspices of the Government.

THE METROPOLITAN INTERMENTS BILL.

The abuses which it was the original object of the Intramural Interment Bill to abolish, are so flagrant and notorious, that the urgency of the case might fairly be expected to disarm opposition. The bill was introduced at a time when the calamity of a fatal epidemic was fresh in the recollection of the public, and this circumstance was ingeniously turned to account, fear being used as a lever to raise the bill into public favour, and various arguments being adduced for the purpose of fostering the impression that the only radical cure for the evils was the bill and nothing but the bill. A quack doctor, in precisely the same manner, operates on the fears of his patients to induce them to swallow his "specific," assuring them that nothing else will save their lives.

The two cases are analogous: the symptoms are urgent, and an active remedy is required. The only question admitting of a doubt has reference to the infallibility of the specific. The specific habitually prescribed by the Board of Health is a *Government commission*, and whatever may be the nature of the disorder, the same universal "heal all" is ready for application. In the case before us, the evils to be removed are the existence of burial-grounds in improper places, the over-crowding of others, the consequent desecration of the dead, and the want of accommodation for burials at a suitable distance from populous districts. But the Board of Health, having only one specific, could not contrive a bill prohibiting the nuisances complained of, empowering (or requiring) the authorities having the charge of burial-grounds, to purchase land for extramural interment, and making them responsible under penalties for the due performance of their duties. It probably never occurred to them, that such a bill would extend its salutary influence throughout the kingdom, that wherever evils exist the remedy would meet the emergency, and that the object might be attained without opposition and without revolution. Instead of this rational course being adopted, an expensive, arbitrary, and virtually irresponsible commission is prescribed, and the authors of the prescription undertake to make it up. Disregarding vested interests, private property, and public prejudices, placing all burial-grounds, whether over-crowded or not, whether well-regulated or otherwise, in the same category, they propose to commence business as undertakers; and not content with framing the law, they insist upon carrying it into execution themselves in all its minute details and ramifications. But this being a gigantic undertaking, they are obliged to place some limit on the work which they have chalked out for themselves, and therefore confine the sphere of their operations to the metropolis, leaving the provincial towns (if we are to believe the statement in their own published Report) a prey to all the horrors of putrefaction and pestilence. Now the laws of chemical decomposition are uniform throughout the kingdom, so also are the evils resulting from nuisances. Why, then, should the metropolis alone be protected against these evils? Because the "undertakers" had not a sufficient supply of their specific for exportation out of the metropolis—they could not be ubiquitous—and rather than allow any portion of the power and patronage to be vested in other hands, they leave the provinces to their fate. Probably they intend to open the London shop first, in the expectation that when this is in fair working order, they may have leisure to extend their business into the country. The completion of the parent establishment will be the work of years; what period will be required for the accomplishment of the reformation throughout the kingdom, is a problem which cannot now be solved. But it should be remembered, that a rational Act of Parliament of the nature above alluded to, would have come into simultaneous operation without delay in all places to which its provisions might be applicable.

THE SUPPLY OF WATER TO THE METROPOLIS.

The Report of the Board of Health on this subject is now before the public. The mass of information and evidence which it contains, affords indications of a minute and persevering inquiry into every branch of the question. In all investigations in which Mr. Chadwick is concerned, this is a prominent feature. No labour is spared—every source from whence information could be derived is scrutinised, and the result is systematically arranged. But while we are bound to give every credit to this sanitary reformer, for his indefatigable zeal and industry in collecting facts, we cannot place the same reliance on his deductions. His ruling passion is the centralisation of executive power; this is his "specific;" and, to the establishment of this principle, facts must bend, and evidence must be subservient.

As we predicted long ago, the plan recommended in the Report is the transference of the water supply to the Sewers' Commission. Thames water is to be discarded as speedily as possible. Tanks, butts, and cisterns are to be abolished. The continuous is to be substituted for the intermittent supply. Water Companies are to be discontinued, and the works consolidated under one management. When cesspools were abolished, and the contents flushed into the Thames, it was strongly suspected that one object contemplated in the proceeding was to render absolutely necessary a change in the source of supply, which it was difficult to bring about by other means. Thames water, although previously impure, was not sufficiently polluted to excite the universal disgust of the public. This achievement is now accomplished, and those parties who have succeeded in effecting it, are appropriately selected as the most fit and proper persons to be entrusted with the supply of pure water to the metropolis.

It is the opinion of the Board of Health, that Thames water, as well as that supplied from the river Lea by the New River Company, contains too much lime in solution for culinary and other domestic purposes. We are told that the substitution of a soft water would effect, in the metropolis, a saving in soap equivalent to £50,000? misprinted £5,000,000, per annum! that it would also effect a saving of about one-third of the tea consumed in the metropolis! that for other domestic purposes, soft water would be much more advantageous, and the incrustations in boilers and pipes would be prevented.

It is proposed to obtain a supply at a "gathering ground," comprising an area of above one hundred and fifty square miles, in the neighbourhood of Bagshot, where the water is stated to "vary from one-tenth to one-third the hardness of Thames water."

The Report further states, "That, upon the best estimates which have been obtained, this water may be brought to the metropolis, and delivered pure and filtered into each house, on the system of constant supply, at high pressure; and, at the same time, on the plan of combined works, the waste water may be removed by a proper system of drainage, at a rate not exceeding an average of 3d. or 4d. per week per house, or from thirty to fifty per cent. less than the present charges for defective water supply alone."

From this it may be inferred, that a radical reform has taken place in the Sewers' Commission, since the publication of the Report for the year ending December, 1849, which contains the following items:—

	£	s.	d.
Expenditure—Works	50,309	4	1
" Management	22,400	17	5
Assets	56,171	12	11
Liabilities	100,738	1	1

We suspect that, in the Report of the Board of Health, the expenses of management are not included in the estimate, and fear that the entire calculation is on a par with that of the saving in soap and tea, which, in our opinion, is *greatly exaggerated.*

In some other respects the calculations of the probable expenses are founded on assumptions altogether untenable. For example, it is stated that, when trading companies are the purchasers, "three or four times the market value of land, or other property, is obtained," because the vendors, "*who might otherwise have conceded these, for the public service, at reasonable rates,* consider themselves justified in dealing with the companies as the companies deal with the public—that is, exacting payment from them, not according to the service or the value, but according to their necessities." This is advanced as an argument in favour of the management of these affairs by a Government Commission, instead of by trading companies—an exceedingly sound argument, supposing the hypothesis to be correct. Unfortunately the statement, although it might be quite convincing to marines, will not be equally so to persons experienced in the sale and purchase of land, who are well aware that the vendors of property usually obtain as much as they can get, it being of little consequence to them whether the money comes from the public treasury or trading companies.

In advocating the use of water, almost or entirely free from contamination with calcareous salts, the authors of the Report overlook the danger arising from the action of such water on lead pipes, a circumstance which some years ago occasioned the poisoning of the buckhounds in the royal kennel, and more recently gave rise to several cases of colic in the household of Louis Philippe, at Claremont, where the water is remarkably pure.

We have already given our opinion respecting the Thames and other waters, with reference to their comparative value and applicability to ordinary domestic purposes, and we see no reason to retract or alter this opinion.

If the public could receive a plentiful supply of Thames water taken at a part of the river free from contamination with the sewage of the Metropolis, there would practically be no cause for complaint. At the same time it must be admitted that a water containing a smaller quantity of salts in solution would be preferable, provided the amount be sufficient to prevent the action of the water on lead pipes.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

ELECTION OF PRESIDENT, VICE-PRESIDENT, &c.

At a meeting of the Council, held on Wednesday, the 5th of June, the following gentlemen were elected President, Vice-President, and Treasurer of the Pharmaceutical Society for the ensuing year:—

President ....Mr. William Ince, 31, Southampton Street, Covent Garden.
Vice-President...Mr. George Waugh, 177, Regent Street.
Treasurer ....Mr. Rich. Hotham Pigeon, jun.

PHARMACEUTICAL MEETING,
JUNE 12th, 1850.
MR. JACOB BELL IN THE CHAIR.

The following papers were read:—

ON OIL OF THYME, COMMONLY SOLD AS OIL OF ORIGANUM.

BY DANIEL HANBURY.

The vast number of plants included in the botanical order of Labiatæ, and the very close alliance of many, render it not surprising that the history of their essential oils should in a few instances be involved in a degree of confusion or doubt. Nor is this the less to be wondered at, when we reflect on the great similarity of many of these oils, our imperfect means of distinguishing them and of ascertaining their purity, the unavoidable alteration produced on some by extraction, to say nothing of differences arising from locality, or from want of care in conducting the process of distillation.

The essential oil which I propose to submit to notice at this time, is not one of importance to medicine; yet having had the opportunity of visiting the district where it is obtained, I have elicited a few facts regarding it which appear sufficiently interesting to be laid before the Pharmaceutical Society.

The volatile oil sold by Chemists as *Oleum origani* is often popularly, and almost always commercially, termed *Oil of Thyme.* Writers on Materia Medica generally mention the latter name as an *incorrect* appellation of the true *oleum origani vulgaris,* a statement, the converse of which I believe to be by far more usually the case.

During a visit to the South of France in the autumn of last year, I procured from the manufacturer a sample of an essential oil of thyme, as well as a specimen of the plant from which it is distilled. This oil, which was submitted to Dr. Pereira, proved to be identical with the "*oleum origani*" of English druggists; and the plant, which was kindly examined by Dr. Lindley and G. Bentham, has been ascertained to be *Thymus vulgaris.* The latter gentleman in a note to me states, that the plant in question is "the true *Thymus vulgaris,* so abundant on the arid wastes of Lower Languedoc as to be much used with rosemary and lavender for fuel."

Thymus vulgaris, the common thyme of the gardens, is collected from the rocky hills in the department of Gard in the South of France, and the entire plant is submitted to distillation with water. The oil, which is of a reddish-brown colour, is called *Huile rouge de Thym*. Redistillation renders it colourless, and it is then termed *Huile blanche de Thym*. The coloured oil, however, is that most commonly sold.

The trade of distilling oils of thyme, lavender, rosemary, &c. is chiefly in the hands of small manufacturers at Milhaud, Aujargues, Souvignargues, and other villages in the vicinity of Nismes. From the makers, the oils are purchased by the merchants in the neighbouring towns, and thence exported to distant parts.

The question naturally arises,—is all the "*oleum origani*" used in this country thus derived? I believe it to be so. I have not been able to discover that any is manufactured here, nor have I succeeded in procuring a sample so essentially differing from oil of thyme, as to warrant my believing it to be genuine oil of origanum. The extremely low price at which oil of thyme can be produced in the South of France, and the common purposes to which it is applied, seem to preclude all attempt at competition in other localities. Cheap, however, as it is, it is yet occasionally the subject of adulteration with oil of turpentine, whose odour in such case may be readily detected, especially on comparison with a good sample.

That the consumption of oil of thyme in this country is considerable, may be gathered from the following extract from "*An Expository Statement of the Consumption of imported Commodities within the United Kingdom in two years preceding and in two years following the establishment of the New Tariff, presented to both Houses of Parliament, by command of Her Majesty*, 1845."

OIL OF THYME.

Quantities retained for Home Consumption.			
Years ending 5th January,		**Years ending 5th July,**	
1839.	**1841.**	**1843.**	**1844.**
11,938 lb	**8,818 lb**	**7,991 lb**	**7,553 lb**

Although the duty under the new tariff was reduced from 1*s.* 4*d.* to 1*s.* per lb., the consumption declined. Whether it has continued to do so, it is not easy to ascertain, as no official return similar to that above quoted has since been published.

London, 12*th of* 6*th month*, 1850.

NOTE ON THE DECOMPOSITION OF SULPHATE OF COPPER AND ORGANIC MATTER.

BY MR. HENRY SUGDEN EVANS.

SOME little time since, a compound, containing sulphate of copper and other ingredients, mixed with bitumen and mineral naphtha, was submitted to me for analysis. As would be expected from such a compound, when heated and ignited in an open crucible, the various hydro-carbons, with sulphurous acid and carbonic acid gases, were eliminated, and only traces of hydro-sulphuric acid could be detected. The charred mass remaining in the crucible consisted merely of reduced metal and carbon. In this experiment the sulphuric acid only yielded one equivalent of its oxygen to the organic matter, and the merest traces of it were entirely deprived of oxygen, the sulphur combining with the hydrogen of the organic matter.

When, however, the same compound was decomposed by heat in a close glass retort, naphtha and other volatile products passed over into the receiver first; and, as the temperature was increased to dull redness, large quantities of carbonic and hydro-sulphuric acid gases, with carburetted hydrogen, were liberated, and small quantities of water, with just a trace of sulphurous acid, were given off. The hard spongy coke which remained in the retort contained the reduced metal, but not a trace of sulphate, sulphite, or oxide could be found; the whole of the copper had been reduced. The decomposition of the sulphate commenced immediately after the whole of the liquid products had distilled over. In this experiment, it will be observed that the whole of the sulphuric acid and the metallic oxide were entirely deprived of their oxygen, which combined with the organic carbon and hydrogen, while the reduced sulphur combined with hydrogen, forming hydro-sulphuric acid gas. These experiments were repeated several times, and were attended with precisely the same results.

This kind of reaction between metallic sulphates and organic matter is not mentioned in any of the treatises on Chemistry to which I have access; but Gmelin remarks (*Cav. Trans.*, vol. ii., p. 191), that solution of alkaline sulphates are decomposed by organic matter, the sulphur giving up its oxygen to the organic carbon and hydrogen; but according to another hypothesis, the sulphuric acid and alkaline base are both deprived of their oxygen. It frequently happens when these mixtures are exposed to the atmosphere, that merely a portion of the oxygen is removed from the sulphate, and the result is the formation of a sulphite; but sometimes, as in the case of the waters on the coast of Africa, alkaline sulphates and organic matter are decomposed, and hydro-sulphuric acid, with carbide of hydrogen, are abundantly developed.

Mr. Bastick (*Ph. Journal*, vol. vii., p. 105), observes, that water containing gypsum and ethereal oil in solution, suffers decomposition when allowed to remain in a close vessel for some weeks. The water becomes saturated with hydro-sulphuric acid, while the whole of the ethereal oil disappears, leaving a deposit of carbonate of lime.

The experiments which have called forth this notice seem to show that the acid and the base of metallic sulphates give up their oxygen to organic matter, when heated with it in a close vessel, free from atmospheric oxygen; but that the acid only gives up a portion of its oxygen when atmospheric air is admitted freely, the metallic oxide yielding its oxygen to the carbon resulting from the decomposition of the organic matter only at a red heat.

31, *Fleet Street, Liverpool,*
May 8th, 1850.

GAS-FURNACE FOR PERFORMING COMBUSTIONS IN ORGANIC ANALYSIS.

BY LIONEL S. BEALE, ESQ.

This gas-furnace is intended for heating the combustion-tubes used in organic analysis, by means of a mixture of common coal-gas and air burning on the surface of wire-gauze. It consists essentially of an iron chamber, at the lower part of which is placed a long brass tube, perforated in its whole length with small holes, from any number of which the gas can be permitted to issue by moving a piston, and thus the quantity of gas which escapes into and mixes with the air of the chamber can be regulated. The mixed gases pass upwards, and are ignited on the surface of iron wire-gauze which is stretched over the top of the chamber. A *sliding* partition accurately fits this chamber, and reaches up to the wire-gauze, dividing it as well as the chamber into two parts, whose length may be varied according to the extent of combustion-tube which is to be heated. The gas is only allowed to escape into one of the two cavities into which the chamber is divided by the partition, by moving the piston in the brass tube accordingly. By this arrangement it is evident that any length of tube may be heated, and by simply moving the sliding partition and piston in a corresponding degree, the heat can be gradually extended from one end of the combustion-tube to the other.

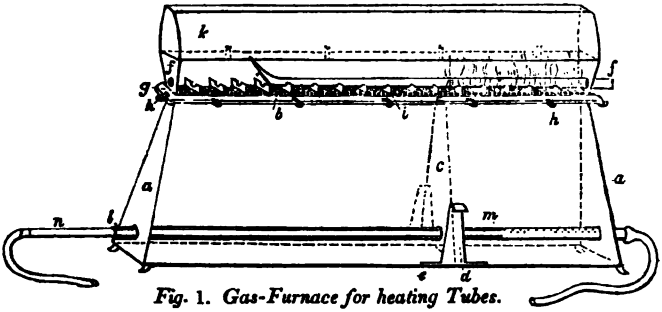


Fig. 1. *Gas-Furnace for heating Tubes.*

The chamber (fig. 1 *a*) may be described as a box made of sheet-iron, open above and below, with four small legs, about an inch and a quarter in width at the upper, and nearly five inches in the lower part, twenty inches long above, and an inch or two longer below. Over the upper portion of this box is stretched a double layer of coarse iron wire-gauze (figs. 1 & 3 *b*, fig. 4), and within it slides the partition (fig. 1 *c*, fig. 2), which is moved backwards and forwards by the handles (*d*), and is kept in its place by sliding on a lip (*e*) projecting from the sides of the box. The upper part of the partition touches the lower layer of wire-gauze.

Above the wire-gauze there is an iron frame (*f*) for carrying the supports for the combustion-tube. The sides of this frame are about an inch and a half in depth, and are wider apart above than below, where they are bent outwards so as to form a wide lip (*g*), which is fixed to a corresponding lip, projecting from the sides of the lower chamber by means of small clamps (*h*). The gauze is placed between these lips, and is thus kept fixed firmly in its place, and when worn out can be readily replaced by removing the clamps. The sides of this frame are perforated at their lower part by numerous holes (*i*), about three-eighths of an inch long and half as wide, in order to admit a current of air (shown by the direction of the arrows, fig. 3), which, when the gas is lighted, causes the flame to impinge on either side of the combustion-tube, which is thus entirely surrounded with fire. The draught is increased and the heat confined by means of two moveable sides (*k*), which can be placed on each side of the frame above-mentioned. These are bent towards the centre, so as to leave a slit about three-quarters of an inch in width at the upper part of the furnace, thus forming a sort of chimney.

The brass tube (*l*) for carrying the gas should be of pretty regular bore, and about three-quarters of an inch in diameter, perforated in its whole length by two rows of small holes about half an inch apart. This tube is placed in the lower part of the box, and passes through each end of it, where it is fixed in its place by screw-caps. The moveable partition moves freely upon it. At one end the brass pipe is connected by a portion of flexible tubing with the gas-pipe. The piston (*m*) is hollow, and is attached to a piece of inflexible pipe (*n*), by which it can be moved freely up and down the tube, and it is connected by flexible tubing to another gas-pipe. By this arrangement gas is made to enter the brass tube at each end, and by the movement of the piston the quantity of gas can be regulated and allowed to issue from any number of the holes according to the position of the diaphragm.

The diaphragm, or partition (fig. 2), is made with a flat top and sides, so as to prevent the possibility of the mixed gases passing from one chamber to the other.

Should the heat be so great as to produce holes in the combustion-tube, a long narrow slip of iron may be passed between the layers of wire-gauze, which causes the flame to diverge from the centre.

This furnace will heat a Bohemian glass tube filled with oxide of copper, sixteen inches in length, to bright redness, and burns between twenty and thirty cubic feet of gas per hour.

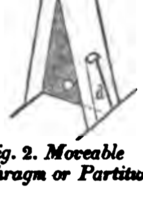


Fig. 2. Moveable Diaphragm or Partition.

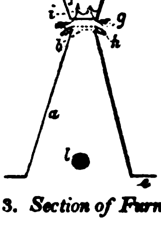


Fig. 3. Section of Furnace.

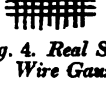


Fig. 4. Real Size of Wire Gauze.

Gas Furnace for heating common Earthen Crucibles.—This furnace (fig. 5) is a slight modification of the gas-furnace in ordinary use, by which a sufficient degree of heat can be obtained to raise ten or twelve ounces of oxide of copper to redness, in a common Cornish crucible, or to fuse a silicate with carbonate of soda, &c.

The tube (*a*) in which the coal gas mixes with the air should not be less than nine inches in height and three in diameter. The gas issues from a small tube (*b*) in the lower part, and burns with the air on the surface of wire-gauze (*c*), similar to that used in the combustion-furnace. Just above the wire-gauze there are several small holes (*d*), similar to those in the furnace just mentioned. The crucible is supported by small pieces of iron, projecting from a wide iron ring (*e*), made to fit the furnace, and which can be removed, and replaced by others adapted to crucibles of various sizes. The upper part of the body of the furnace can be removed when required; and there is a small door in it to enable the operator to watch the processes going on within.

Long Acre, June, 1850.

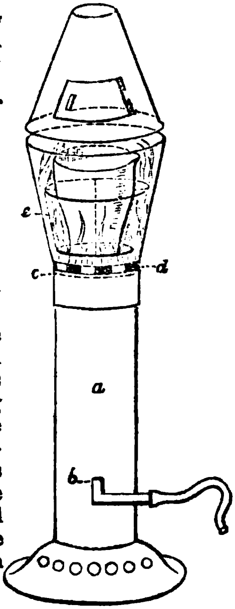
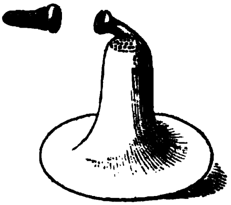


Fig. 5. Crucible Furnace.

The CHAIRMAN drew attention to a NIPPLE PROTECTOR, introduced by Mr. Taylor, a specimen of which was on the table. It is composed of glass with an Indian-rubber mouth-piece, or it may be used with a heifer's teat if preferred. The subjoined cut makes further description unnecessary.*



BOARD OF EXAMINERS.

THE Board of Examiners give notice that on and after the October examination they will require from all candidates for the minor examinations a copy, from an abbreviated prescription, to be written out in full, with all its terminals; and a *viva voce* examination in connection with the same. Also a *viva voce* translation of some parts of the Latin Pharmacopœia of London.

The same requirements will extend to the major examination in those cases were the candidates have not passed the minor one.

W. INCE, *President.*

Board of Examiners, June 2, 1850.

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* The nipple protector was sent for exhibition to the meeting by Mr. Medley, 9, Clayton Place, Kennington Road. It is also sold by Barclay and Sons, Farringdon Street.

THE LIVERPOOL CHEMISTS' ASSOCIATION.

The *Pharmaceutical Journal* for July, 1849, contains an account of the establishment of this Association, the Transactions of which have been published in subsequent numbers.

The first Anniversary was held on Monday, the 10th of June, in the large lecture room of the Liverpool Royal Institution.

MR. CLAY, PRESIDENT, IN THE CHAIR.

The Chairman, in opening the meeting, congratulated the members on the success which had attended their exertions, and, having made a few remarks on the advantage of pharmaceutical education, the favourable position of the school, and the industry of the students, called upon Mr. Edwards, the Secretary, to read the Annual

REPORT.

Your council, in presenting their first Annual Report have great pleasure in referring to the success which has attended their efforts, the history of the past year having surpassed their most hopeful anticipations.

The readiness with which the members have entered into all their views, the unanimity which has prevailed, and the increasing interest in the proceedings of the society, evinced both by the members themselves and by the medical profession, give them great encouragement to hope that their onerous duties have not been inefficiently performed, and that the objects they have sought to attain are already in course of realization ; and in laying before the society this account of their stewardship, they sincerely trust that the confidence they hope they have earned will be manifested by the growing interest and increasing numbers of the next year's experience.

THE PHARMACEUTICAL MEETINGS

Have been uniformly well attended, and much interest has been exhibited in the subjects brought before the society.

While the information conveyed by the lecturers has been of a sterling character, and possessed much intrinsic practical value, discussions have occasionally arisen which have imparted additional interest to the meetings ; and by calling forth repeated experiments and eliciting new facts, the subjects thus involved have been much elucidated.

The society has been favoured by the attendance of several medical and scientific gentlemen, who have expressed their interest in the subjects brought forward, and their concurrence in the general objects of the society.

The council have to record the great obligation the society is under to those gentlemen who have favoured it with lectures and scientific papers.

THE LABORATORY

Of the Royal Institution has been opened for the practical study of chemistry, and is made use of by two classes—the first, of young men, under the direction of Professor Hamilton, who follow the course laid down by the council. This class is twenty-two in number, and the interest with which the study is entered into by its members, is a good omen of its practical utility.

The other class is of principals, who avail themselves of the assistance of Dr. Brett, and follow such a course of study as each may choose. These gentlemen have expressed themselves fully convinced of the utility and advantage of devoting a portion of time to laboratory practice.

LIBRARY.

A few books have been presented to the society, and others have been purchased for the use of the students. It is extremely desirable that a good pharmaceutical library should be formed, and the council appeal to the liberality of the members to contribute such books, which frequently possess but little utility when scattered, but which would, if amassed, form a library of great value. The following works are now in the possession of the society: — Chaptal's Chemistry, three vols.; Brande's Manual, two vols.; Turner's Chemistry, two vols.; Rose's Analysis, Gregory's Outlines of Chemistry, two vols.; Fownes's Manual of Chemistry; Fownes's Chemical Tables; Griffin's Chemical Recreations; Phillips's Translation, P.L. 1836; Campbell's Text Book; Plattner on the Blowpipe.

MUSEUM.

A few specimen of drugs and chemicals have been presented to the society, and others are accruing as productions of the laboratory.

With the unusual facilities afforded in this great port for collecting information, and obtaining specimens of foreign productions, it is hoped that the society will ultimately possess a *museum of specimens* unequalled elsewhere; and the council would particularly urge upon those members who are connected with the shipping trade to avail themselves, on behalf of the society, of the many opportunities afforded them of thus collecting valuable information, which is greatly wanted in many departments of *materia medica*.

They would, also, impress the importance of this subject on the minds of all the members who have friends from time to time emigrating to or visiting foreign parts; by furnishing such with a list of subjects for investigation (which are only too numerous) much light may be thrown upon many points but little understood, and a valuable collection of specimens obtained.

BOTANY.

The council have memoralized the Gardens' Committee of the Town Council, praying them to devote a portion of the Botanic Gardens to the express cultivation of medicinal plants, arranged in their natural families; and also to increase the number of medical plants.

This application was courteously received and promptly complied with; the curator has received the necessary instructions, and the ground is being prepared. It is hoped that next spring this very desirable aid to the study of medical botany will be fully carried out.

The especial thanks of the society are due to Dr. Dickinson, who kindly exerted his influence in carrying out this project, and who has also allowed the members to attend a portion of his botanical course of lectures at the medical school, and has also promised further demonstration in the gardens.

TRANSACTIONS.

The council desire to express their sense of the obligation they are under to Mr. Jacob Bell, who, as editor of the *Pharmaceutical Journal*, has rendered them essential service by giving a place to their Transactions in that valuable periodical, and to whom they are much indebted for advice and assistance at the formation of the society, as well as for his countenance and aid on the present occasion.

The financial statement was read, from which it appeared that after the liabilities of the society had been discharged, there would remain in the hands of the treasurer a balance of £15, besides which, a sum of about twenty guineas, which had been expended during the past twelve months, would not recur another year, thus enabling the council to anticipate many additions to the library in the ensuing year.

Mr. Sumner moved, and Mr. Walker seconded, the adoption of the report, which was carried by acclamation. Resolutions relative to the future procedure of the society were moved, seconded, and supported by Mr. Johnson, of Birkenhead; Mr. Johnson, of Liverpool; Mr. Abraham, Mr. Walker, Mr. Rowland, Mr. E. Evans, Mr. Jardine, Mr. Alpass, and others. It was resolved that Messrs. Rawle, Wagstaff, and Jardine be added to the Council. After an unanimous vote of thanks to the various gentlemen who had delivered lectures and furnished communications during the past year, the chairman called upon Mr. Jacob Bell, to whom, he said, the members were greatly indebted for assistance in the establishment of the institution, to offer a few observations.

Mr. Bell remarked that the progress of the Association had been very satisfactory; and that, considering the great advantages afforded by the Royal Institution, with the valuable aid of the professors, he thought there was every encouragement for perseverance. It must not be supposed that all the labour was over. In every society there must be, in addition to the arduous labours of establishing it, a period of trial, for which they must be prepared, when, the novelty having worn off, the excitement partially subsided. The staunch supporters must then put their shoulders to the wheel, and renew their efforts, directing attention to the progress made by the pupils as an additional stimulus. In every society the chief labour devolves on a few members, whose object should be to keep alive the interest of others by every means in their power, giving the whole credit of their individual exertions to the society, enlisting as many co-operators as possible, and thus avoiding the possible contingency of their zeal being attributed to other than public motives. Mr. Bell, in conclusion, adverted to the necessity of supporting the parent society, the prospect of permanent benefit to the trade depending on the concentration of the influence of the Chemists throughout the country in one institution. Although circumstances, not under the controul of the society, had hitherto delayed the passing of a pharmaceutical bill, this would, without doubt, be accomplished, if the Chemists would persevere.

Mr. Morson congratulated the members on the success of the school, which, considering the very small cost, had accomplished more than he should have anticipated. He considered that principals, as well as assistants, were interested in the advancement of education, as it was only by this means that they could obtain young men in whom they, as well as the public, could place full confidence; and, as all classes of society are advancing in knowledge, the Chemists would find it necessary to keep pace with the times.

In the course of the meeting, allusion was made to certain scurrilous attacks on the Pharmaceutical Society and some of its members, in a journal recently started, and a vote of confidence was passed, reprobating this cowardly attempt to injure the society.

Votes of thanks were passed to Mr. Edwards, the Hon. Secretary, for his zeal and attention to the interests of the Association—to the Council for their united exertions—and to the Messrs. Morson and Bell, who had come from London to attend the meeting. Thanks were also voted to the chairman, and duly acknowledged.

ANALYSIS OF THE BOOTLE WATER*.

BY DR. SHERIDAN MUSPRATT, F.R.S.E.

I HAVE much pleasure in forwarding to your Journal an exact analysis of the genuine Bootle water. The results *prove* that I have not heretofore analyzed this water; and convince myself, *more than ever*, that I can rely upon my own accuracy without seeking the corroboration of others.

	Grains per imperial gallon.
Chloride of sodium	3.22
Carbonate of lime	7.89
Carbonate of magnesia	4.78
Sulphate of soda	3.27
Carbonate of soda, &c. &c.	1.59
	20.75

College of Chemistry,
Liverpool, June 3, 1850.

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[*] The water was taken on the 17th of May by Messrs. Danson and Moncrieff from the first reservoir, which supplies the engine pumping the water to the main reservoir.

ORIGINAL AND EXTRACTED ARTICLES.

THE KOSSO OR BRAYERA ANTHELMINTICA.

BY JONATHAN PEREIRA, M.D., F.R.S.

HISTORY.—*Kosso* has been in use in Abyssinia, as an anthelmintic for more than two centuries; for Leutholf (Ludolfi, *Historia Æthiopica*, lib. i., cap. ix., sect. 31, 1681) says that "N. Godingus* praises another tree as being very efficacious against *lumbrici*, which are produced by the use of raw meat. But the Abyssinians purge themselves every month with the fruit of this tree, and thus," he says, "destroy these worms." Now there can be little doubt, I conceive, but that this passage refers to the *kosso*.

Bruce in his *Travels to discover the Source of the Nile, from* 1768 *to* 1773 (vol. v., p. 73), published at London in 1790, mentions this medicine, which he calls *cusso*, and proposes to name the tree *Banksia Abyssinica*, after Sir Joseph Banks, the then president of the Royal Society. But the younger Linnæus, in the *Supplementum Plantarum*, published at Brunswick in 1781, had already appropriated the name of *Banksia* to a New Holland genus of proteaceous plants, and he has been followed by all succeeding botanists; so that it is obvious that Bruce's proposed botanical name for the *kosso* cannot be adopted.

Bruce gave a very good popular account of *kosso*, accompanied by what he justly terms "a true and exact" figure of the plant. I have compared his figures with a specimen of the plant collected in Abyssinia by Schimper, and contained in the herbarium of my friend

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[*] *De Abyssinorum rebus*, lib. i., cap. 2. Lyon, 1615. 8vo.

Mr. N. B. Ward, and with the commercial flowers, and find that they are fair representations of the plant.

Bruce states that the Abyssinians evacuate once a month " a large quantity of worms; these are not the tape-worm, or those that trouble children, but they are the sort of worm called ascarides." This statement agrees with that of Godingus just quoted; but it does not accord with the observations of other travellers, who tell us that the worms with which the Abyssinians are troubled, and for which they employ the *kosso*, is the tape-worm. The accuracy of this latter statement has been proved by Dr. Hodgkin (*Medical Times*, October 26th, 1844, p. 74) who gave oil of turpentine to an Abyssinian in the service of Dr. Beke, and thereby expelled a Tænia solium—the same kind of tape-worm which prevails in England, and which is understood to prevail at the Cape of Good Hope.

In the *Encyclopédie Méthodique* (*Botanique*, Supplem. t. ii., p. 423, 1811) Lamarck has described the *Cusso d'Abyssinie*, which he named after Dr. C. G. Hagen, a professor at Königsberg, the *Hagenia Abyssinica*. He says the tree was discovered by Brown—but I presume that this is a typographical error, and that for "Brown" should be read "Bruce;"—for the figures of the plant given by Lamarck (pl. 311) are obviously copied from those of Bruce, though he does not refer to this distinguished traveller as his authority.

It is remarkable that Lamarck's proposed generic name (*Hagenia*) has been applied by the late Professor Eschweiler (*Systema Lichenum*, 1824) to a proposed genus of lichens usually included in that of Parmelia; and by Mönch (*Methodus*, 1794) to a caryophyllaceous plant now regarded as a species of Gypsophila. Willdenow (*Species Plantarum*), and Sprengel (*Syst. Veget.* ii., 220, 1825) have each adopted Lamarck's name (*Hagenia Abyssinica*) for *kosso*.

Dr. Brayer, a French physician, who resided for a considerable time at Constantinople, and who had witnessed the valuable anthelmintic properties of *kosso*, and had himself successfully employed this remedy, sent, on his return to Paris, in 1823, some fragments of the male flowers to the late celebrated Prussian botanist, Kunth, who ascertained that the plant which yielded them formed a new genus, near to, but distinct from, that of Agrimonia*. To this genus Kunth gave the name of *Brayera*, after the physician who sent him the flowers, and the species he called *B. anthelmintica*. This generic name has been adopted in the systematic works both of De Candolle (*Prodromus*, vol. ii. p. 588) and Endlicher (*Genera Plantarum*, 6395). Kunth does not appear to have been aware either of Bruce's notice of *kosso*, or that Lamarck had previously given to this genus the name of *Hagenia*, otherwise, doubtless, he would have referred to them, and have adopted this designation. Dr. Brayer published a little pamphlet (*Notice sur une nouvelle Plante de la Famille des Rosacées*, Paris, 1823, 8 pages) on this medicine, but which I have not been able to get a sight of; the reply to my enquiries for it at Paris being that it was out of print. According to the information furnished by Dr. Brayer, it appears that *kosso* is carried by the caravans to Egypt, and from thence finds its way to Constantinople[*].

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* In the first volume, p. 470, of the *Mémoires de l'Academie Royale de Médicine*, it is erroneously stated that *kosso* is the *Agrimonia orientalis* of Tournefort, who saw it in Abyssinia. Now, in the first place, Tournefort never was in Abyssinia; and secondly, the *A. orientalis* (*A. repens*, Linn.) is a creeping herb, whereas the *kosso* is a large tree !

The identity of the genera *Hagenia* and *Brayera* was first recognised by Fresenius (*Museum Senkenbergianum*, vol. ii., p. 162, 1837).

In 1839, Buchner (*Repertorium*, 2te Reihe, Bd. xviii, S. 367) gave a notice of three Abyssinian remedies which he had received from Engelmann. One of these was the *kosso* (called *koso*), which was stated to be the flowers of the *Bracera* [Brayera] *anthelmintica*. In 1840, Wittstein (Buchner's *Repertorium*, 2te Reihe, Bd. xxi., p. 24) published an analysis of *kosso*, which he calls *Bracera anthelmintica*.

Riecke's *Die neuern Arzneimittel*, published in 1840, contains a notice of the *Brayera anthelmintica* by Dr. Plieninger, who obtained his information respecting it from some missionaries returned from Abyssinia; and the same notice includes some botanical and pharmacological account of this medicine by Dr. Kurr.

In 1841, Dr. Aubert, who had spent some time in Abyssinia, read a *Mémoire sur les Substances Anthelmintiques usitées en Abyssinie*, before the Académie Royal de Médecine, at Paris, and which was published in the Memoirs of the Academy for that year. His account of the anthelmintic virtues of the *kosso* confirms the statements of preceding writers. A very interesting Report on his memoir was drawn up by Mérat, and published in the *Bulletin de l'Académie Royale de Medecine*, tom. vi., p. 492, 1840—41.

M. Rochet d'Hericourt, in his *Second Voyage sur les deux Rives de la Mer Rouge dans le Pays des Adels et le Royaume de Choa*, published at Paris in 1846, gives a very brief notice of the *kosso*, with a lithograph of the flowers and leaves. This traveller is the present holder of the entire European stock (about 1400 lbs.) of *kosso*.

Drs. R. Quartin-Dillon and A. Petit, the naturalists of the French expedition to Abyssinia in the years 1838—43, collected the kosso; of which a botanical description has been published by A. Richard, in the *Tentamen Floræ Abyssinicæ*, which forms the fourth volume of the *Voyage en Abyssinie*, edited by M. Th. Lefebvre. The forty-eighth plate of the "Botanique" of this "Voyage" contains an excellent figure of the plant, with dissections of the flower.

NATIVE NAMES.—My friend Dr. Beke, the well-known Abyssinian traveller, has given the following note respecting the native names for this remedy:—"The tree, of the flowers of which you have a sample, is called in the Amharic language *kosso*[†], and in that of Tigre, *hhàbbe*[‡]. In the Gafat language it is styled *kossish*, and in the Gonga, *kosbo*[§]; in the Agau of Waag, *sika;* in that of Agau-mider, *shinei;* and in Falasha, *sakikana;* whilst in Galla, its name is *bêti*. In the countries further to the south, it has other names[||], which, however,

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[*] In the *Journ. de Pharmacie*, t. ix, p. 160, 1828, is an *Extrait du Bulletin de la Société Philomathique*, 1822, containing a notice of Dr. Brayer's observations respecting *kosso*, and of Kunth's determination of the plant.

[†] This word is variously spelt by different writers, *cusso*, *cosso*, *cousso*, *coso*, *koso*, and *kosso*. Dr. Aubert says it should be pronounced (in French) *cousso*.—J. P.

[‡] According to Dr. Plieninger, who obtained his information from the Abyssinian missionaries, the Tigre name is *hepah*. Wittstein writes it *habi*.—J. P.

[§] Written *cobso* by some persons.—J. P.

[||] Dr. Brayer gives *cotz* or *cabotz*, as vernacular names: according to Dr. Aubert (*Bullet. de l'Acad. Royale*) these names are erroneous.

I have not collected in my vocabularies of the languages of those countries. But it is best known in Abyssinia and Europe by its Amharic designation, *kosso*." Dr. Beke further observes, that "the tape-worm, for which the kosso flowers are a remedy, is known in the languages of Amhara and Tigre by the same names respectively as the medicine itself, viz., *kosso* and *hhàbbe*. So, too, in the Gafat and Ginga, in which respectively both are called *kóssish* and *kósbo*. In the Waag-Agau, likewise, the name *sika* is the same for both; but in the dialect of Agau-mider, the worm is called *turo*, and, in the Falasha, *saka;* whilst in the Galla, it is *minui*."

BOTANY.—The first accurate botanical description of the flowers of *kosso* was given by Kunth, whose account has been adopted in De Candolle's *Prodromus*. Kunth, however, was acquainted with the male flowers only. The most recent systematic notice of the genus Brayera is that of Endlicher, which I shall adopt.

BRAYERA *Kunth*.

BRAYERA Kunth in *Brayer Notice*, in 8vo, 1824, Paris; *Dict. Class. Hist. Nat.*, vol. ii., p. 501, cum icone. DC. *Prodr.* ii. 588. Meisner *Gen.* 103 (73). Fresenius in *Mus. Senkerb.* ii. 162; Endlicher, *Gen. Plant.*, p. 1248, 6395; HAGENIA Lamarck *Encycl. Méth. Bot.*, Suppl. t. ii., p. 423; Willdenow *Sp. Pl.* ii. 331. CUSSO, BANKESIA, Bruce's *Travels*, vol. v., p. 73.

Calyx, with the tube bitracteolate at the base, turbinate; throat constricted internally by a membraneous ring; limb, 10-partite; the segments in two series, the five outer ones much larger, oblong-lanceolate, obtuse, reticulate-veined, stellately patent, the five inner ones alternate, smaller, spathulate. *Petals* 5, inserted in the throat of the calyx, small, linear. *Stamens* from fifteen to twenty, inserted along with the petals. *Filaments* free, unequal in length. *Anthers* bilocular, dehiscing longitudinally. *Carpella* two, placed at the bottom of the calyx, free, unilocular, containing one or two pendulous ovules. *Styles* terminal, exserted from the throat of the calyx, thickened upwards. *Stigmas* subpeltate-dilated, crenato-oblong.

Nat. Ord.—ROSACEÆ Jussieu. De Candolle places it in Tribe v. *Dryadeæ*. Endlicher, in his suborder, *Spiræaceæ*.

BRAYERA ANTHELMINTICA, Kunth, l. c. DC. l. c.; A. Richard, Tentamen Floræ Abyssinicæ; *Hagenia Abyssinica*, Lamarck, l.c.; *Cusso, Bankesia Abyssinica*, Bruce, l. c.

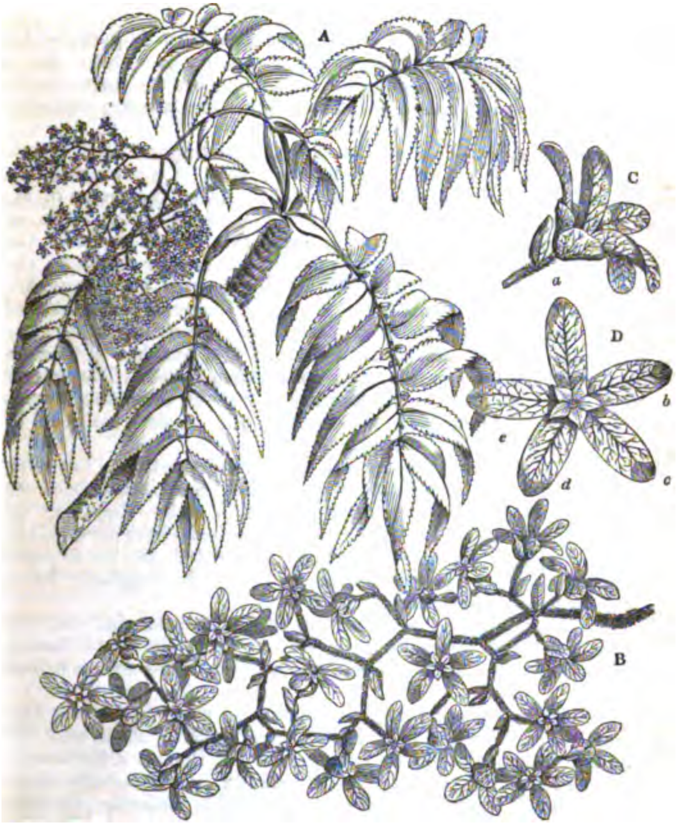
The only species.

An Abyssinian tree, twenty feet high. Branches round, rusty, tomentose-villose, marked by the annular cicatrices of the fallen leaves. Leaves crowded, alternate, interruptedly imparipinnate and sheathing at the base. Leaflets oblong, or elliptical lanceolate, acute, serrate, villose at the margin and on the nerves of the under surface. Stipules adnate to the petiole, which is dilated at the base and amplexicaul. Flowers diœcious, small, greenish, and becoming purple; repeatedly dichotomous; the pedicels with an ovate bract at the base.

The so-called male flowers may be regarded as hermaphrodite flowers, inasmuch as the carpels are well developed. The female flowers are somewhat different in their structure. The outer segments of the calyx are much more developed than in the female flowers, and are four or five times larger than those of the inner row, and are placed somewhat below them; the petals are entirely wanting; the stamina are rudimentary and sterile.

The ripe fruits are unknown.

The tree grows in Tigre, Agame, and Shoa; it is cultivated everywhere.



Brayera anthelmintica Kunth.

A. Flowering branch. B. Bunch of female flowers. C. Flower seen laterally. D. Female flower. *a*, *b*, *c*, *d*, *e* the five outer segments of the calyx.

Dr. Beke writes that the tree is "found throughout the entire table land of North-eastern Abyssinia, but appears to require an elevation of upwards of six thousand (perhaps of seven thousand) feet for its growth. Where I found it most luxuriant was in the vicinity of the source of the river Abai (Bruce's Nile), at an elevation of close upon nine thousand feet. Tigre, the northern portion of Abyssinia, being, on the whole, of lower elevation than the rest of that country, the tree is only found there in a few places."

Bruce describes the flowers as being of a greenish colour, tinged with purple; and, when fully blown, of a deep red or purple. The petals, he says, are white.

PREPARATION.—Mr. Johnston states that the kosso is gathered for medicinal purposes before the seeds are quite ripe, whilst still a number of florets remain unchanged. The bunches are suspended in the sun to dry, and if not required for immediate use, are deposited in a jar.

PHARMACOGRAPHY.—I have seen only one package of *kosso (flores brayeræ anthelminticæ)*; this was kindly opened in my presence by M. Simond, of the firm of Caylits, Simond, and Co., the agents of M. Rochet d'Hericourt. It was a deal-box, containing about 30lbs. of the dried flowers, wrapped up in a large skin of red leather. On removing the lid of the box and untying the leather package, the fragrant or balsamic odour of the dried flowers was very powerful. It appeared to me to be somewhat similar to the combined odours of tea, hops, and senna-leaves. The flowers had apparently undergone no preparation beyond that of desiccation. The bunches of flowers were perfect and unbroken, though of course compressed. The general colour of the dried mass was greenish-yellow; but when the flowers were more closely examined, the edges of the petals were seen to have a reddish or purplish colour.

The taste of the dried flowers is at first not very marked, but after a few minutes a feeble, senna-like, acrid, unpleasant taste becomes perceptible. By soaking the dried flowers in water they may be unfolded sufficiently to determine their botanical characters, which have been already described. When submitted to microscopic examination the hairs are perceived to be simple lymphatic hairs, tapering at the distal extremity.

In Abyssinia, two sorts of kosso are distinguished; viz., 1st, the *red* kosso produced by the female flowers; 2dly, the male flowers known as *kosso-esels*. In commerce, the two sorts are always mixed together.

ADULTERATION.—Considering the enormous price (about £1 15*s*. per ounce) at which kosso has hitherto been sold in Paris, and the very limited quantity originally supplied by M. Rochet d'Hericourt, it cannot be surprising that the article should be extensively adulterated. Indeed, I have been assured, on credible authority, that the powder now selling as "kousso" is, in fact, the powder of pomegranate bark; and that legal proceedings have been commenced in Paris to put a stop to the fraud, which is well calculated to injure the reputation of the genuine Abyssinian remedy.

I have no doubt but that the microscope would readily detect the substitution; but the surest way of obtaining the genuine article, is to purchase the dried flowers in the entire state, not in the form of powder.

CHEMISTRY.—The flowers of the Brayera (*i. e. kosso*) have been analysed by Wittstein (*ante cit.*) and by Martin (*Journ. de Chimie Med.*, t. vi., 2nde sér., p. 579, 1840). The following are the results obtained:—

Wittstein's Analysis.

Fatty oil ... Chlorophylle	1.44
Wax	2.02
Bitter acrid resin	6.25
Tasteless resin	0.77
Sugar	1.08
Gum	7.22
Tannin striking a green colour with iron	8.94
Tannin striking a blue colour with iron	15.46
Vegetable fibre	40.97
Ashes	15.71
	99.86
[Loss	00.14]
	100.00

Martin's Analysis.

Starch
Saccharine matter
Vegetable extractive matter
Green very odorous resin
Crystalline substance, called *kwoseine*

The *ashes* consist of potash, magnesia, lime, oxide of iron, sulphuric and phosphoric acids, chlorine, and silica.

With regard to the two kinds of *tannin*, Wittstein observes that, as far as he knows, this is the first instance recorded of a plant containing simultaneously two kinds of tannin, striking, the one a blue, the other a green, colour with the salts of iron.

Although it is not improbable that the anthelmintic property of *kosso* may in part depend on tannin (since the pomegranate bark, which contains this principle in abundance, is, like *kosso*, also an anthelmintic), yet what may be termed the peculiar property of the kosso probably resides chiefly in the bitter acrid resin. This is soluble in alcohol and in ether, and appears to be a neutral body, manifesting neither distinct alkaline nor acid properties.

The crystalline principle to which Martin has given the barbarous name of *kwoséine* (from *kwoso*, the supposed name for *kosso*), is described as consisting of white silky crystals, having a styptic taste, and as being soluble in alcohol and sulphuric ether. They are said to redden litmus paper, and to dissolve, without undergoing decomposition, in sulphuric, nitric, and muriatic acids.

By boiling the dried plant in water a fragrant odour is evolved. No doubt this as well as the odour of the dried plant itself depends on the presence of a *volatile oil*, of which, however, no mention is made in Wittstein's analysis, the oil being present in too small a quantity to admit of its collection when small quantities of the flowers are operated on.

It is not improbable that the anthelmintic properties may in part depend on this oil, for Schimper states, that in Abyssinia the plant is considered to have lost its anthelmintic powers in the third year after its collection. In Europe, however, it retains its powers for a longer period (on account of the cooler climate ?); for the flowers which have been used for all the recent experiments, have been collected more than four years, and we are told in the shop-bill of a Parisian pharmacien, that they may be kept for an indefinite period!

An infusion or a decoction of kosso strikes a dark green olive tint with a solution of the sesquichloride of iron.

Medicinal Properties.—Neither botanical characters, sensible qualities, nor chemical composition, would have induced us to suspect that *kosso* possesses the valuable anthelmintic properties which experience has shown that it does.

The general and prevailing quality of the Rosaceæ is astringency, dependent on the presence of tannic and gallic acids. This is observed in the flowers (*e. g.* rose petals), as well as in other parts of the plants. In this quality *kosso* agrees with its congeners. But it can scarcely be on this that its vermifuge property solely depends; otherwise rose petals, or any other equally powerful astringent, would be as effective in expelling worms as these Abyssinian flowers. But in Rosaceæ, as in many other families of the vegetable kingdom, anomalies exist—and to this head we must for the present be content to refer *kosso*.

Our confidence in the anthelmintic properties of kosso rests, then, on experience only; and the evidence on this point is very strong. All modern travellers in Abyssinia are agreed on the great success of the remedy on the natives of that country; and the experience of physicians in France, England, Germany, and Switzerland, confirms the favourable reports made by those who have seen the kosso used in its native country.

In Paris it has been employed with great success by Chomel and Sandras (*Ann. de Therap.*, *pour* 1847), as well as by numerous other distinguished physicians. In London our experience of it is much more limited; but the successful results of its use in King's College Hospital, in the hands of Drs. Budd and Todd (*Lancet*, March 16th, April 20th, and May 25th, 1850), and of Dr. Gull (*Lancet*, May 25th), in Guy's Hospital, confirm the favourable reports of its efficacy, which had reached this country from abroad.

The physiological effects of *kosso* are not in general very great. Sometimes it excites a slight sensation of heat, nausea, or even vomiting, creates thirst, and frequently, perhaps usually, a gentle action on the bowels. But the latter is commonly so slight, that in a considerable number of cases, it is necessary to follow its administration by a mild purgative. It is obvious, therefore, that the efficacy of kosso as an anthelmintic does not depend on its purgative or evacuant influence, but on its poisonous or toxic action on the worm; in fact, it is a true *vermicide*. In one case, that of a woman in France, it brought away ten worms, of which one only manifested evidences of vitality, and that for a few minutes only.

Kosso appears to be an effective anthelmintic in both kinds of tape-worm, viz., the *Tænia solium*, and *Bothriocephalus latus*. In most of the reported successful cases, the *Tænia solium* was the parasite expelled; but in one of Chomel's cases, the worm which was evacuated was the *Bothriocephalus latus*, and I am informed, that kosso has proved most effectual in Switzerland, where, as is well known, the *Bothriocephalus* is the prevailing tape-worm.

The dealers in kosso assert that one dose will, in every case, effect the radical cure of tape-worm. But this must be obviously an error. Even supposing that it invariably destroys all the worms in the alimentary canal at the time of its exhibition, it can in no way prevent their recurrence, provided the patient retains his predisposition (which there is no reason to suppose is affected by the kosso), and is subjected to the same influence. It certainly does not radically cure the

Abyssinians, since, as several writers tell us, they resort to this remedy monthly. Schimper, the governor of Adoa, says it does not completely expel the tænia, or at least rarely does so. But, he adds, that possibly in Europeans, in whom the verminous disposition is not so pronounced as in the Abyssinians, it may perhaps act in a more complete manner. In the Abyssinians this verminous disposition is innate, and is dependent, he adds, on the regimen which they adopt.

Hitherto the great drawback to the use of kosso has been the difficulty of procuring the remedy, and its enormous cost. At the time when it could be purchased in Paris its price was £1 15*s.* per oz., or 17*s.* 6*d.* per dose. M. Rochet d'Hericourt, the sole holder of the medicine at the present time, refuses to sell any quantity less than his entire stock, at the rate of one guinea per ounce! His nephew tells me that his uncle possesses 1400lbs. of it, which, at one guinea per ounce, will cost 22,400 guineas!!! The impossibility of effecting a sale on such terms will, I doubt not, ultimately compel the holder to reduce his demands to something approaching to reason. It does not appear that the remedy is very costly in Abyssinia. Schimper, writing from Adoa, in Abyssinia, says that it is found in commerce at a very low price. At Yangaro (commonly called Zingaro) the sovereign has the exclusive use of it, his subjects being prohibited from employing it; but in other parts, free trade in kosso is permitted. Considering the frequency and rapidity of our communications with Egypt (to which place, according to Dr. Brayer, *kosso* is conveyed by caravans) no difficulty I apprehend will be experienced in obtaining an abundant supply of it. Its present price is a virtual prohibition of its use.

The flavour though not very strong is by no means agreeable; and is sufficiently powerful in some patients to create disgust and excite vomiting. In one case, under M. Chomel (*Ann. de Therap. pour* 1847), the whole of the remedy was rejected by vomiting.

No ill effects have resulted from its use in this country; nor have I met with any statement of its injurious action, except in Mr. Johnston's *Travels in Southern Abyssinia* (vol. ii., p. 272, 1844), where it is stated that its—

> " operation is speedy and effectual; and to judge by the prostration of strength it occasioned in my servants when they employed this medicine, it must be dreadfully severe. I can answer for this, that it occasions frequent miscarriages, often fatal to the mother, and even men have been known, after a large dose, to have died the same day from its consequences. I am, therefore, surprised at the noise this remedy has occasioned the last few years in Europe, as if it promised to be a valuable addition to our Materia Medica. This, I conceive, can never be, for no civilized stomach could bear the bulk of the drug necessary to produce its effects. Even in Abyssinia it is but barely tolerated, and let another remedy equally efficacious for dislodging tape-worm be introduced into that country, and the use of cosso will be soon abandoned. In fact, several other vegetable productions are now employed to escape the punishment of a dose of this violent cathartic."

ADMINISTRATION.— Both Bruce (*op. ante cit.*) and Schimper (Bourchardat, *Annuaire de Therapeut. pour* 1849, p. 257) tell us that the Abyssinians take a handful of the dried flowers as a dose. In Paris the dose has varied from four to six drachms. In general, however, half an ounce (troy weight) is considered a dose for an adult.

For different ages the doses are thus adjusted:

Adults ....1 dose = 240 grs. (half-an-ounce)
Children of from 7 to 12 years...... ⅔ of a dose = 160 grs.
" " 3 to 7 " ...... ½ of a dose = 120 grs.
" not exceeding 3 " ...... ⅓ of a dose = 80 grs.

The kosso should be taken in the morning fasting. The only preparation necessary is, that the last meal of the previous evening should be slight. The evacuation of the bowels by a mild purgative or a lavement is also desirable.

The mode of administering the remedy is as follows:—The powdered flowers are to be mixed with luke-warm water (for an adult about ten ounces), and allowed to infuse for a quarter of an hour. A little lemon juice is then to be swallowed, and, the infusion being stirred up, the whole is taken, liquid and powder, at two or three draughts, at short intervals, being washed down by cold water and lemon juice. To promote the operation, tea (without sugar or milk) may be taken. In three or four hours, if the remedy has not operated, a dose of castor oil or a saline purgative should be administered.

ON THE PURIFICATION OF CHLOROFORM.

BY MR. JOHN ABRAHAM.

IN *Chambers' Journal* for May 4, is a paper by Professor Gregory, of Edinburgh, on the subject of Chloroform, which has been copied into other publications, and extensively read.

He says, "as no absolutely pure chloroform has yet been sold, so far as we can ascertain, by any maker out of Edinburgh, while the large majority of the makers have sold a very inferior article, it is not surprising that its use should have proved less satisfactory, for example, in London than here. To give an idea of the fact, we may state that we have examined recent specimens which contained only three-fourths, one-half, one-fourth, one-fifth, and even so low as one-twentieth of their volume of chloroform." It is not stated where these specimens were obtained, but afterwards, he says, "fortunately for Edinburgh and for chloroform—we may add, fortunately for suffering humanity, the Edinburgh makers have always taken the best means and the greatest pains to produce good, chloroform." The Professor gives what he calls a test of its purity, and "an easy mode of purification," which consists, in agitating the chloroform with sulphuric acid, and afterwards with peroxide of manganese. "It is then of specific gravity 1.500, and absolutely pure." The blackening of the sulphuric acid is a proof of impurity, and its absence the reverse.

Now, Sir, I beg to caution your readers that the fact of any sample of chloroform having been manufactured in Edinburgh, is no proof of its purity; and I would recommend them to apply another test in addition to the one suggested by the Professor.

It is well known that the Scotch manufacturers having spirit much cheaper than it can be obtained in England, have a great advantage over the English makers of chloroform. In February last, it was offered to me by one of the most respectable of the Edinburgh houses, at a price very much lower than I had ever before paid, and in consequence I obtained two Winchester quarts. It was professedly of the density 1.497. I found it to be about that, and I considered it good, though I thought it a shade less sweet than what I had been accustomed to use.

Last month I found that it had acquired a suffocating odour, a greenish, oily-looking substance was deposited on the sides of the bottle, and the same appearance is evident in one of the bottles which is nearly full, and which has not been opened whilst in my possession, and has been kept in a dark cool closet. Moistened litmus paper suspended over it in a bottle was first reddened and afterwards bleached. Water with which it was washed indicated hydrochloric acid in considerable quantity. The bleaching I attribute to free chlorine, as I did not find sulphurous acid. It was unfit for respiration. Sulphuric acid was but slightly discoloured by it.

I next examined chloroform of Liverpool manufacture, which I had in my possession before I received the sample from Edinburgh; it showed no trace of acid or of free chlorine; it discoloured sulphuric acid considerably, but had no effect on litmus paper suspended as before. A slight inhalation of it produced no unpleasant effects, and as I have repeatedly inhaled and witnessed the administration of chloroform of the same maker, with the most satisfactory results, I venture to doubt whether the substance which blackens the acid is always that which produces the unpleasant effects sometimes attributed to chloroform.

I next tried the Professor's mode of purification, but after its application the reddening and bleaching of the litmus paper was produced by both preparations. From the Liverpool chloroform I had not much difficulty in removing these unsatisfactory indications; but with the Edinburgh I have had great difficulty, and I have only succeeded after repeated agitations with sulphuric acid, carb. barytes, milk of lime, and several distillations. It remains to be seen whether this purification is real—whether it will keep good.

Professor Gregory gives a second test of the purity of chloroform, which he considers still more delicate than the former. He states that pure chloroform leaves no smell when allowed to evaporate from the hand, and that impure chloroform bears an odour which is generally in proportion to its effect in colouring the acid. I infer that the substance which blackens the acid is not always the same, because the facts are, in my judgment, not so in the samples of which I have spoken. I find that dropping the chloroform on paper affords the best means of applying this test, and that specimen which darkens the acid considerably, leaves, if any, certainly the least smell. I shall be happy to send you specimens. My first note of the sp. gr. of chloroform is in Nov. 1847, about the time it was made known as an anasthetic. It is 1.485 and 1.489. My next is 1.491, and the Liverpool chloroform, of which I have spoken, is 1.495, at 62°.

I have to day received an 8lb. bottle of chloroform from another Edinburgh house, who showed me some time ago a certificate from Dr. Gregory, that their chloroform was absolutely pure. It has been opened and examined by an assistant in my presence. It is very similar to the former Edinburgh specimen. Its odour is similar. It reddens, and speedily bleaches litmus paper, suspended as before. Its sp. gr. at 71° appears 1.490 in a bottle graduated at 60°. It scarcely colours sulphuric acid. I have not had time to make a more complete examination.

Bold Street, Liverpool, June 18, 1850.

NOTE ON THE ADULTERATION OF ISINGLASS.

BY MR. REDWOOD.

I HAVE stated, in a paper published in the May number of this Journal (page 503), that I obtained .5 grain of ash from 100 grains of isinglass, and 3. grains of ash from 100 grains of gelatine, and that carbonate of lime was a principal constituent of these ashes. A minute analysis was not made, the only object in determining their composition having been to ascertain whether there was such a marked difference as would serve to indicate the presence of gelatine when mixed with isinglass.

Messrs. Phillips and Cooper, in their report on the above subject, published last month, state that they obtained .86 grain of ash from 100 grains of isinglass, and .52 grain of ash from 100 grains of Swinburn's gelatine—that the former contained no carbonate of lime, and the latter only a trace of that substance.

Being anxious to remove or explain the discrepancies in these results, I have repeated and extended the experiments previously made.

The difference in the two results given with reference to the incineration of isinglass may have arisen, as stated in the editorial remarks appended to the report in the last number of this Journal, in consequence of the isinglass operated upon by Messrs. Phillips and Cooper having been bleached, and retaining free sulphuric acid as well as adhering sand. It was desirable, however, that there should be no doubt as to the nature of the ash resulting from the incineration of the best isinglass. It would have been a remarkable fact, had the inorganic constituents of the swimming-bladder of a fish been found to contain sulphate and not carbonate of lime; but the fact is otherwise, as I have satisfied myself by repeated experiments, and I have nothing to retract from my former statement on this point.

With reference to the inorganic constituents of gelatine, Messrs. Phillips and Cooper state that they obtained only .52 grain of ash from Swinburn's gelatine. I had not examined this kind of gelatine in my former experiments, but have subsequently done so, and the result differs very widely from that above given, the amount of ash varying from 1.8 grains to 2.1 grains from 100, in four different specimens operated upon. I ascribe the difference in our results to circumstances attending the process of incineration. In the first combustion of gelatine I made, the amount of ash nearly coincided with that given by Messrs. Phillips and Cooper, but I discovered that a great part of the inorganic matter was carried off during the calcination, in the current of hot-air which rises from the crucible, and this source of error was, therefore, provided against in subsequent operations.

In getting the ashes both of isinglass and gelatine, I have operated upon one hundred grains at a time. The specimens under examination have been burnt in a large platinum crucible, having a capacity of five fluid ounces; and during the combustion, the mouth of the crucible has been covered with a piece of wire gauze. The organic substance fuses and swells up during this part of the process, and, when combustible gases cease to be emitted, the residue consists of a spongy carbonaceous mass. If the subsequent calcination of this mass were effected while it retains its vesicular condition, there would be great loss of inorganic matter, as already noticed; but this result is obviated by reducing it to a fine powder, and then calcining it in a deep crucible.

The results obtained by this mode of operating leave no doubt that gelatine yields much more ash than good isinglass. The kind of gelatine sold as "Swinburn's Patent Refined Isinglass," which is a high-priced article, in the preparation of which much care has obviously been taken, yields 1.8 grains of ash from 100 grains; while some of the common kinds of gelatine yield as much as four per cent. of ash. Gelatine, therefore, yields from four to eight times as much ash as the best isinglass.

I see no reason to alter, in any respect, the opinion I have expressed with reference to the adulteration which has been practised, and the means best adapted for detecting the fraud.

THE INFLUENCE OF LIME ON THE PUTREFACTIVE PROCESS.

THE employment of quick lime for accelerating the destruction of dead bodies having been recommended by the Board of Health, we prepared the following article some months ago, the publication of which has been delayed on account of the pressure of other matter. This subject was investigated many years ago by Dr. Davy, who arrived at results directly opposed to the popular belief in the destructive powers of lime. The following is an extract from his paper:*

On the Action of Lime on the Textures of the Human Body.

"It is commonly asserted and believed that lime exercises a corroding, destructive influence on animal matter in general, and that animal bodies exposed to its action rapidly decompose and disappear. Accordingly, it has been almost invariably recommended to add this earth to graves, in instances in which a rapid decay is considered desirable, as on the occasion of the crowding of grave-pits with dead bodies during the prevalence of pestilential diseases. From the results of many experiments which I have made with lime on animal substances, I have been compelled to come to the conclusion that this opinion is not well founded in fact; indeed, that it is altogether erroneous.

"The experiments were commenced in Malta, in the summer of 1829, and they were carried on during the following year. The method observed was to immerse the animal matter for trial in cream of lime, or rather a paste of lime, contained in a wide-mouthed bottle, well corked and covered with cerate cloth, to exclude the ingress of atmospheric air, and to preserve the lime in its caustic state.

"One of the first experiments tried was commenced on the 27th of August. Portions of various textures were immersed, as mentioned above. They were taken from a subject in a state of incipient putrefaction, and they inhaled a fetid smell. On immersion in the lime and water, as might be expected, they gave off a strong ammoniacal odour. They were first examined on the 24th of September. They were then all in excellent preservation, swollen, but not corroded, nor their delicate tissue injured. They were next examined seven months after, viz., on the 5th of May of the year following. The report was equally favourable. It is stated that they were much in the same state as before, the texture of each part distinct, and the part, as a whole, easily distinguishable. They were left undisturbed nearly two years, until the 6th April, 1832, when, on examination, they were found to have undergone material change. The cuticle had become soft and transparent, as had also the dura mater, admitting of being torn with the greatest ease. The muscle appeared to be converted into adipocire, which was quite white, had no unpleasant smell, was friable when dried, and burned with a bright flame without any unpleasant smell. The other parts were not distinguishable. Most of the lime was converted into carbonate of lime, atmospheric air not having been entirely excluded.

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* *Jameson's Journal*, January; and *Medical Gazette*, January 25.

"The second experiment recorded was commenced in the beginning of October. Portions of aorta, dura mater, intestine, skin, cellular tissue, muscle, and tendon, were similarly treated. The results were examined on the 5th May following. Then, on opening the bottle, an ammoniacal but no putrid smell was perceptible. The parts were found well preserved, excepting the fatty matter contained in the cellular tissue, which had become of an opaque white, and friable, from combination, with the alkaline earth, and conversion into soap. The tendon, it is mentioned, was somewhat distended, and rendered more transparent, but not gelatinized; and so also, in a less degree, were the dura mater and cutis; and the last was deprived of its cuticle and hair.

"Some other experiments were made; but, as the results were very similar, it would be tedious to describe them. I may state, generally, that with the exception of cuticle, nail, and perhaps hair, lime exerted on the different textures, on which it was tried, no destructive power, but a contrary influence, and more particularly a well marked antiseptic one. It has been stated, how certain parts in the first experiment lost the putrid odour which they had acquired when immersed in lime and water. Moreover, it appears from notes of experiments, that after animal substances have been fully subjected to the action of lime, they ceased to be putrescent; they resisted putrefaction, whether placed in air or plunged and kept in common water. I shall mention one instance. On the 13th of May, 1830, a portion of ileum, with mesentery attached, and a portion of the muscular part of the heart, with the chordæ tendineæ, were placed in a large jar of transparent lime-water, and covered with cerate cloth. Examined nine months after, on the 16th of February, they were found in good preservation, and without any putrid or unpleasant odour. The only change perceptible was, that the portion of heart and intestine had acquired a light greenish hue, and the tendon an opalescent hue; and all were a little softened. A crust of carbonate of lime had formed on the water, which still retained some caustic lime. They were then transferred to a jar of common water, where, after four days, they continued unaltered. I may add that a portion of cutis, similarly treated, placed in confined air in a bottle, after a whole month emitted no unpleasant odour, and appeared to be unchanged.

"I have observed, that cuticle, nail, and perhaps hair are to be excluded from the list of animal substances not materially altered by the action of lime. On the cuticle its action is powerful; and, I apprehend, in consequence of a chemical combination between them being formed. It is well known how lime has the property of rendering the cuticle easily separable from the cutis vera, and how, in the art of tanning, it is applied to this purpose. The human cuticle—that, for instance, of the sole of the foot—I find becomes soft and gelatinous from immersion in lime and water. After drying, a portion thus tried (well washed previous to drying) was white, semi-transparent, and brittle. Incinerated, it yielded seventeen per cent. of ash, which consisted principally of lime and carbonate of lime.

"The effect of lime on nail is similar to that which it exercises on cuticle, but not so strongly marked. A portion of nail of the great toe, macerated in lime and water, from the 7th of June to the 18th of August, was rendered soft and friable, a little swollen, and disposed to separate or break up in layers. Dried, it exhibited the same character as cuticle; and when incinerated, burned in a similar manner, and left a considerable ash, consisting of a small proportion of phosphate of lime, which pre-existed in the nail, and a large proportion of lime, with which, during the change from maceration, it may be inferred it combined.

"On hair the effect of lime appears to be more destructive; but in what manner it acts I have not attempted to ascertain. A portion of human hair of the head, which had been kept in lime and water about three months, was partially decomposed. At the bottom of the vessel there was a little black sediment. The hair, which was black, had acquired a just perceptible reddish shade, and had become much finer, as if wasted, and more friable, so as to be easily broken.

"Relative to the results of the experiments generally, they appear to me to bear me out in the remark with which I prefaced them—viz., that lime does not exercise a destructive corroding power on animal substances generally, nor one promoting their decomposition; but, on the contrary, a preservative and decidedly antiseptic power, arresting putrefaction even when commenced, and retarding decomposition. What new arrangements of the elements of animal matter may take place under the influence of lime is a subject for further inquiry. Probably, the effects of lime on cuticle, nail, and hair, on which, in the arts, its operation has been best known, led to the ideas of its agency on animal substances generally, which I have been under the necessity of combating."

About the time that the recommendation above alluded to was under discussion Dr. Taylor published, in the *Medical Gazette*, some interesting observations, from which we extract the following, on

The Effect of Lime on Putrefaction.

"I am unable to find, in any work relating to the signs of death, facts which tend to bear out the popular belief that lime accelerates putrefaction. By the strong affinity of this alkali for water, as well as by its chemical power of fixing carbonic acid, sulphuretted hydrogen, and other animal effluvia, it is admirably adapted to prevent the escape of these effluvia from a putrefying corpse; and, when placed in a coffin or a grave, it will then, to a certain extent, exert a beneficial influence.

"On the unbroken human skin powdered lime appears to have no corrosive or chemical action whatever. It is the least soluble of all the alkalies, excepting magnesia. A stiff cream of lime possesses no corrosive properties on the skin,—while solutions of potash, soda, and ammonia, even when considerably diluted, rapidly dissolve it. Potash and soda, however, by this well-known action on animal matter, do not accelerate putrefaction: they merely act chemically by combining with and dissolving the tissues; and, were lime more soluble than it is, it would probably soften and dissolve the soft parts of the body.[†]

"The following experiment shows what its influence is on the raw flesh of a recently dead animal. Two pieces of beef, the one (A) covered with powdered lime, which had become partially slaked by exposure to air, and the other (B) left uncovered in its raw state, were exposed to the air of an apartment, at a temperature of about 55° for fourteen days. In the course of four days, the uncovered piece of beef (B) was very offensive from putrefaction. The piece which had been covered with lime (A) had also undergone decomposition; but the effluvia had been so retained by the lime, that no odour was perceptible, except within a few inches. The uncovered beef (B), at the end of a fortnight, had become somewhat dry

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Lime is largely used in the cleansing of skins for tanning; it has no chemical or corrosive action on them, but merely serves to combine with and remove the fat.

on the surface, from evaporation; but it was much putrefied, and very offensive. The piece covered with lime (A) remained soft, and quite firm in the fibre. It had an offensive smell at a short distance, modified evidently by the action of the lime; but there was no appearance of corrosion, no chemical softening of structure, nor any change of condition to indicate that putrefaction had been at all accelerated or even modified in it. When closely examined, the external surface had acquired a greenish colour; but this was apparently due to the chemical effect of the alkali on the hæmatosine.‡

"This green colour was found to be only superficial; for within, the muscular fibre had a dark-red brown colour, like that of the uncovered beef (B). After the lapse of three weeks, B had become much reduced in bulk by evaporation, while A, the beef covered with lime, still remained soft, and retained all the toughness of fibre peculiar to it. There was not the least sign of corrosion, or of any chemical action, excepting the slight superficial change of colour above adverted to. At the end of five weeks, both pieces had become perfectly dried, as a result of evaporation, and putrefaction had become entirely arrested. The piece A, which had been covered with lime, was as hard and firm as a piece of wood, and broke with a brittle fracture. The piece B retained a certain degree of toughness. There was no loss in either, except that which had arisen from mere evaporation and shrinking.

"Judging from the result of this experiment, although lime cannot be said to retard, there is no proof that it accelerates or even modifies the process of putrefaction. With the exception of changing the colour of the blood to green, in parts denuded of skin, it appears to exert no other influence on the process than that produced by chalk, clay, or any other insoluble powder laid over dead animal matter. It cuts off to a certain extent the access of air, and, if used in a very thick layer, it would thereby rather tend to retard than to quicken putrefaction. It prevents evaporation for a certain period, so that the animal matter remains soft for a longer time; but, in the end, the water is absorbed, and the animal substance becomes hard, dry, brittle, and imputrescible.

"It appears to me that there is an entire want of evidence that lime under any circumstances quickens putrefaction. This process is essentially dependent on *heat*, *moisture*, and *air*, and according to the presence or absence of these conditions, so is the process rapid or slow. The three conditions must co-operate, or putrefaction will be arrested. Thus a *temperature* of 32° or 212° puts an end to the process. As to the effect of *moisture*, I have found that albumen—a substance which putrefies in a few hours—may, when deprived of its moisture by chloride of calcium, be kept without any change for twenty years, exposed to the air at the most favourable temperature for putrefaction. The effect of *air* is entirely due to oxygen. In an experiment performed some years ago, a piece of beef was perfectly preserved for *two hundred and sixty-four days*, through all changes of temperature during this long period, without putrefying. This was effected by merely suspending it in a bell-jar containing deutoxide of nitrogen gas, which, as it is well known, acts by preventing the access of oxygen.

"The popular idea that lime quickens putrefaction, has probably arisen from the supposition that it was used with this view in coffins and graves. Its action, however, is really that of preventing the diffusion of noxious effluvia; and for this purpose, by its rapid combination with carbonic acid, sulphuretted hydrogen, phosphuretted hydrogen, and animal effluvia generally, it is admirably adapted. In an experiment recently performed, it was ascertained that a drachm and a half of slaked lime removed in ten minutes the whole of the sulphuretted hydrogen and carbonic acid from forty ounces of foul sewer-water, which, before the addition of the alkali, evolved sulphuretted hydrogen in large quantity. In this respect it was found to be much superior to the chloride of zinc, which at the best can only remove a part of the sulphuretted hydrogen, and does not at all affect the other offensive effluvia.

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‡ The green colour of the skin and muscles during putrefaction is probably owing to the evolution of ammonia and the action of this alkali in a nascent state on the red colouring matter of the blood contained in the minute vessels. It appears first on the skin of the abdomen, probably from the decomposition of the contents of the intestines, and is one of the most striking signs of real death.

"Lime will be found a very cheap, safe, and useful deodoriser. Its value as such does not appear to be sufficiently known."

ON THE MANUFACTURE OF PYROLIGNOUS ACID, PYROXYLIC SPIRIT, OR WOOD NAPHTHA, AND THE COMMERCIAL ACETATES OF LIME, SODA, AND LEAD, AND ACETIC ACID.

PART I.—*Apparatus employed in the Carbonization of Wood, and quantities of Charcoal and Crude Acid obtained.*—The counties of Monmouthshire, Gloucestershire, and Glamorganshire in the West, and of Northumberland in the North, are the principal seats in this country of the manufacture of products derived from the distillation of wood. There are also establishments at Manchester, Wigan, Deptford, Croydon, Southampton, Birmingham, Liverpool, Chester, &c., &c. In the greater number of these works cast-iron cylinders of various dimensions, set horizontally in brickwork, are employed. At the Melancrythan works, near Neath, there are fifteen of these cylinders, each six feet by four feet seven inches, and capable of holding about twelve cwt. of wood; two of these cylinders are heated by one fire; the doors of the cylinders are moveable, and, when put on, are secured by means of nuts and screws to the rim of each cylinder. Twenty-four hours is usually allowed for the carbonization of each charge of wood; but when small wood is used, or the demand for the acid is great, three charges, or even four, are worked off in the twenty-four hours.

At the works of the Copper Miners' Company at Cwm Avon, near Swansea, twelve iron cylinders, of six feet six inches by four feet seven inches, are employed, and about half a ton of wood is the usual quantity for the charge of each cylinder. One fire furnishes heat to two cylinders; twenty-four hours is allowed for carbonization. These cylinders are set according to the plan pointed out by Parkes in his Chemical Essays (Article *Carbon*).

At Pitchcombe chemical works, near Stroud, in Gloucestershire, cylinders of various sizes, from two feet six inches to upwards of four feet in width, and from seven to nine feet in length, are employed. Cylinders of nine feet by two feet ten inches are employed with considerable advantage, five cylinders being so set in an arch of brick-work that two fires are sufficient to supply the heat required for the carbonization of their contents. Thirteen of these cylinders hold five and a half cords of split wood, each cord being sixteen feet eight inches in length, and two feet two inches in width and height, and weighing, when in an average dry state, from twenty-three to twenty-five cwt. This quantity of wood is carbonized with an expenditure of about one ton and a half of coal. Twenty-four hours are allowed for the process of carbonization.

At Breeme works, near Lydney, in the Forest of Dean, there are eight large square ovens, each capable of containing two sheet-iron boxes, four feet six inches by two feet nine in the interior measurement; in each of these boxes about half a cord of wood is placed, and, as the wood is piled up above the top of the sheet-iron box, the ovens are required to be of a size proportioned to this height. The doors of the ovens are on hinges, and, when closed, are fastened and luted in the usual manner. These ovens are charged once a day; but as the wood employed is small, twenty-four hours is more than sufficient to effect its carbonization. The boxes, when charged, are run along a railroad into the ovens, and drawn out again in the same manner, whereby much labour is saved. Square ovens of the same kind were also tried at the Melancrythan works before mentioned, but from some cause or other did not prove successful.

At Newport, in Monmouthshire, and at Carmarthen, ovens of a similar kind to those employed at Lydney are in use, and answer very well.

At Cornbrook works, near Manchester, cast-iron cylinders of six feet by three feet are employed, with square doors, on hinges, placed in the centre of the front of each cylinder. Six tons of wood are carbonized by means of one and a half ton of coal. Twenty-four hours are allowed for the process of carbonization. Two cylinders are heated by one fire.

The Risca and Abercarn works, both in Monmouthshire, and belonging to one proprietor, form conjointly the largest works of the kind in this country. At Risca, cast-iron cylinders, six feet by four feet, holding about three quarters of a cord of wood each, are employed, as also large wrought-iron chests, with an iron pipe, of six inches diameter, passing through to convey the heat to the interior of the chest, each of which is capable of holding one cord and a quarter of wood.

At Abercarn, eight square ovens, with boxes, are used, each oven being capable of containing one cord of wood. Twenty-four hours is usually allowed for carbonization; but a charge can be worked off in from twelve to sixteen hours if required. At Chester works, large cylinders are employed, also a large square oven like that at Risca, and much the same as that described by Dr. Ure in his Dictionary of Arts and Sciences. The heated cast-iron pipe passing through the interior of the dense mass of wood, very much assists its carbonization. At Lougher, near Swansea, and also at Deptford, the following form of carbonizing apparatus is adopted:—A large circular sheet-iron vessel is set in brick-work, having an aperture of a particular shape and size in the top; within this carbonizer, the sheet-iron vessels containing the wood are placed. These are of such a shape, that six of them, each two feet wide at one part, and four feet deep, form, when put together, a shape corresponding with that of the carbonizing vessel in which they are contained. As there is but one aperture in the carbonizer through which to introduce the six inner vessels containing the wood, a moveable frame-work is placed at the bottom of the carbonizer, by means of which each of the receptacles for the inner vessels are in turn brought under the aperture in the top of the cylinder, and receive the casing of wood destined for them. The aperture is then closed with a sheet-iron lid, and luted in the ordinary manner.

At the works of M. Mollerat, at Nuits, M. Bobee, of Choisy-le-Roi, and MM. Hardel, frères of Dieppedalle, near Rouen, the following carbonizing apparatus is employed:—The wood is placed in large cylindrical vessels of sheet-iron, well-riveted, and the cover placed on. Two of these vessels are swung by means of a crane into upright cylinders of stout brick-work, connected together, each of which is just large enough to admit one of the sheet-iron cylinders. The whole is then covered with a dome of brick-work or masonry, and a moderate heat is applied by means of one fire, which serves to heat the two cylinders. By means of an opening at the upper part of one side of each of the iron cylinders, an adapter is introduced, which serves to connect the cylinders with the condensing apparatus employed.

In the immediate neighbourhood of Paris, are some works where the heat employed for carbonization is obtained from the coke-ovens. Where a good market can be obtained for coke, there is no doubt but that such a plan would be very economical.

From a careful observation of the results obtained by the employment of the various means above-mentioned for effecting the carbonization of wood, it would appear that for large billets and heavy wood, such as the cordwood of Gloucestershire, and the refuse ship-timber of Liverpool and Newcastle, the cast-iron cylinder of a width of from two feet six inches to two feet ten inches, and of a length of eight to ten feet, is the form of apparatus to be preferred; whilst for the lighter and smaller wood, such as is now most generally employed in Wales and Monmouthshire, the ovens appear to be more convenient. The supply of wood often differs with regard to size, and it would be desirable that each works should be fitted up with both kinds of carbonizing apparatus.

When cast-iron cylinders are employed, the charcoal is drawn out by means of long rakes; iron shields almost the size of the inner measurement of the cylinder, with a chain attached to them, reaching to the mouth of the cylinder, are very convenient for this purpose, as by their use, the workmen, laying hold of the end of the chain with a suitable tool, can draw out the whole charge quickly and without breaking the charcoal so much as when rakes alone are employed; in either case the charcoal is received into moveable sheet-iron boxes, or into pits lined with brickwork sunk in the ground in the front of the cylinders; both boxes and pits have iron covers fitted to them, which are rendered air-tight by means of clay or ashes.

The result of the destructive distillation of wood in close vessels, having either of the various forms above mentioned, is the formation of charcoal, which remains in the cylinder or retort, and of certain gases and vapours which pass off through the exit-pipe of the apparatus employed into suitable refrigerators, in which the vapours are condensed in the liquid form; the uncondensed gases pass off from the refrigerators into the atmosphere, or are collected in suitable gasholders or receivers, or are at once conducted by pipes to the ash-pit of the cylinder fire-places and ignited, thus serving to economise the consumption of fuel; the liquid products pass into tanks or vessels of wood placed in the ground, from which they are pumped up when required for use.

In most of the works in this country the condensation of the liquid products of the distillation of wood is effected by causing them to traverse a long series of copper or iron pipes, placed, if possible, in a stream of running water. These pipes should be connected with the exit-pipe of the cylinder by a flange joint, having a collar of coke, or of compressed charcoal-powder, or some other non-conducting substance placed between them.

The liquid products of the distillation of wood may be comprised under the heads of acid, spirituous, tarry, and oleaginous; the gaseous products are carbonic acid, carbonic oxide, olefiant gas, and light carburetted hydrogen. The relative proportion of charcoal, and of liquid and gaseous products, depend on the nature and quality of the wood employed, and the regulation of the temperature. Stolze is quite right in his statement that the strongest acid is obtained from firm woods of slow growth in a dry soil; then those in moist grounds; and, lastly, the weakest from pines and resinous trees, the product from these being much inferior to all the others.

We close this part of our subject with a selection of Tables indicating the quantity of charcoal, and the quantity and strength of crude pyroligneous acid as obtained on the large scale in actual practice, first giving the table of products obtained from wood by Stolze on the small scale.

ONE POUND OF WOOD.	Weight of acid.	One ounce of acid neutralized of pure carb. of potash.	Weight of empyreumatic oil.	Weight of charcoal.
	ounces.	grains.	ounces.	ounces.
White Birch	7⅛	55	1⅜	3⅞
Red Beech	7	54	1¼	3⅞
Large-leaved Linden	6⅞	52	1⅞	3⅝
Oak	6⅞	50	1⅛	4⅛
Common Ash	7⅛	44	1⅜	3¾
Horse Chestnut	7⅜	41	1⅜	3¼
Lombardy Poplar	7⅜	40	1⅜	3¾
White Poplar	7⅜	39	1¼	3¾
Bird Cherry	7	37	1¼	3⅛
Basket Willow	7⅜	35	1⅛	3⅛
Buckthorn	7⅛	34	1⅜	3⅛
Logwood	7⅛	35	1⅛	2
Alder	7⅜	30	1⅛	3⅛
Juniper	7¼	29	1¾	3⅝
White Fir	6⅝	29	2⅛	3⅝
Common Pine	6¾	28	1⅞	3⅛
Common Savine	7	27	1⅞	3⅜
Red Fir	6⅝	25	2¼	3¾

84 POUNDS WOOD.	Charcoal.	Charcoal, per cwt. of wood.	Acid liquor.	Sp. grav. of ditto.	Sp. grav. of ditto, saturated with lime.	Measures of soda to neutralize acid liquor.	Incondensable products.	Real Acid.
Birch	23½	31.33	45	1.046	1.080	70	15	1.86
Elm	21½	28.66	45½	1.036	1.075	83	17½	2.26
Willow	18	24	49	1.029	1.045	29	17	0.77
Beech (low tem.)	24	32	46	1.039	1.090	115	14	3.06
Ditto (high tem.)	20	26.64	47	1.034	1.067	90	17	2.40
Laburnum	20	26.64	46	1.030	1.055	75	18	2.00
Ash	23	30.68	48	1.035	1.078	92	13	2.45
Alder	20	26.64	48	1.030	1.065	70	16	1.86
Hawthorn	20	26.64	27	1.040	1.100	140	37	3.73
Young Oak	28	37.33	39	1.038	1.085	115	14	3.06

A. P. HALLIDAY, *Cornbrook Works, Manchester.*

336 POUNDS WOOD.	Charcoal.	Charcoal, per cwt. of wood.	Acid liquor.	Sp. grav. of acid liquor.	ʒj neutralized grains of bicarb. of potash.	Dry acetate of lime produced.
Beech	84	28.00	180	1.029	9½	25
Walnut	72	24.00	150	1.018	7	14½
Birch (cut three years)	70	23.33	120	1,031	11	13
Oak	91	30.33	190	1.022	8	24
Ash	90	30.00	190	1.024	8	22
Apple	70	23.33	200	1.017	6	18
Wych Elm	70	23.33	180	1.018	8	16
Maple	77	25.66	145	1.018	6	20

DURDEN & Co., *Pitchcombe Works, Stroud.*

The *ensemble* of three works in the neighbourhood of Paris shewed the following products from 4000 pounds of wood (beech and oak):—

Charcoal ... 1014 lbs.
Acid liquor 2335 lbs., sp. gr. 1.027=to 416 lbs. of dry acetate of lime.
Tar .... 330 lbs.

The following products were obtained at the works of M. Mollerat, at Nuits, from 1000 steres of wood, weighing 5120 cwt.

Charcoal	1280	cwt.
Pyrolignous acid	850	"
Acetic acid	54	"
Sugar of lead	152	"

In a well-conducted establishment in England the following were the quantities of crude acid liquor obtained by the distillation of 1634 cords of wood; each cord of wood weighing on the average 22 to 35 cwt., according to the longer or shorter time allowed to intervene between the cutting and the using of the wood:—

174	cords produced	23,923	gallons of about 10 lbs. each.
160	" "	27,720	" " "
252	" "	30,424	" " "
318	" "	40,584	" " "
330	" "	55,900	" " "
400	" "	50,700	" " "

DURDEN and Co., *Pitchcombe Works, Stroud.*

The following is one of the Monthly Statements of a Work in the neighbourhood of Paris, in which the wood is carbonized by heat from the coke ovens.

Dr.	*frs.*	*c.*
1000 hectolitres of coal, at 50 fr. the 15 hecto.	3,333	33
500 steres (half-cords) of wood at 9 fr. 20 c.	4,600	00
Wages of coke-oven man	120	00
" " six workmen	450	00
Wages and lodging of two carmen	200	00
Keep of two horses	180	00
Salary of director of works	200	00
Wear and tear, calculated at ten per cent. on the value of the plant (of 60,000 frs.)	500	00
Five per cent. interest on capital	416	00
Rent of ground and cellars for charcoal	100	00
Frs.	10,099	33

Cr.	*frs.*	*c.*
1520 hectolitres of coke, at 49 fr. the hecto.	4,312	00
30 hectolitres small coke, at 32 fr. 50 c.	975	00
750 loads of charcoal, at 6 fr.	4,500	00
150 ditto, second quality, 5 fr.	750	00
50 ditto, third quality, 4 fr.	200	00
20 ditto, powder, 2 fr. 50 c.	62	50
200 casks pyrolignous acid, at 15 fr.	3,000	00
Tar	165	00
Frs.	13,964	50

(*To be continued*).

ON THE PREPARATION OF SUGAR OF LEAD WITH PYROLIGNOUS ACID.

BY G. SCHNEDERMANN.

THE pyrolignous acid employed for the manufacture of sugar of lead ought to be tolerably free from empyreumatic substances, in order to yield a good product. The manufacturers of pyrolignous acid furnish (often under the name of muriate of lead) a product which is very brown by these empyreumatic admixtures, and which is prepared by saturating rectified pyrolignous acid with litharge. In dyeing and printing, sugar of lead is chiefly used for the preparation of acetate of alumina; but as impure sugar of lead is prejudicial to the more delicate colours, pure sugar of lead, prepared from alcohol vinegar, can alone be employed for these, as well as for chrome-yellow, chrome-orange, &c., &c.

Prof. Schnedermann, of Chemnitz, has discovered a method by which the sugar of lead may be obtained from pyrolignous acid in a sufficient state of purity for dyeing purposes. The rough pyrolignous acid is rectified in the usual manner, then super-saturated with slaked lime, and exposed to the air for twenty-four hours, during which time the mass is to be frequently stirred up. By the excess of lime, a great part of the empyreumatic matter, which forms with the lime a more or less brown and insoluble combination, is precipitated. The exposure to the air is necessary, because the empyreumatic matters become more oxydized, assume a deeper colour, and become fitted for combining with lime. The brown solution of the acetate of lime is then separated in a suitable manner from the precipitate, and heated to boiling, when small quantities of a clear solution of chloride of lime are successively added as long as the liquid continues to become paler. After evaporating to dryness, the yellowish-gray residue, which consists of acetate of lime, with a small proportion of chloride of calcium, is decomposed by sulphuric acid. If the acetic acid be intended to be obtained by distillation from this mixture, the sulphuric acid must be diluted with an equal volume of water.

In other cases, the sulphuric acid is not at all to be diluted, or only very slightly so, and added gradually to the decomposed residue, to avoid the generation of heat. The mixture is left standing for a short time; it is then to be diluted with water, and the clear liquid drawn off from the gypsum. In this case it is not advisable to previously dilute the sulphuric acid with water, as the gypsum then assumes a crystalline loose condition, subsides with difficulty, and contains much fluid.

In both cases the acetic acid contains a small quantity of muriatic acid, also sulphurous acid; and, in the latter case, also a small proportion of gypsum. Oxyde of lead is now to be added, and heat applied till the acid reaction is feeble. The precipitate retains sulphurous acid from the gypsum, and also sulphate of lead and chloride of lead. The solution of the acetate of lead yields a yellowish sugar of lead, containing a small quantity of chloride of lead, but which is generally sufficiently pure for dyeing purposes, and can be still further purified by recrystallization.—*Dingler's Polyt. Journal* and *Pharm. Central Blatt*, 1850, p. 317.

ON THE TESTS FOR OPIUM AND ON THE PREPARATION OF AN UNIFORM TINCTURE OF OPIUM.

BY G. REICH, OF KÖNIGSBERG.

IN testing opium to discover the proportion of morphia and narcotine which it contains, the author proceeds in the following manner:—About 100 grains of powdered opium are triturated with one ounce of spirit of wine of 78°, and digested in a glass vessel for several hours at a moderate heat, and the liquid filtered whilst hot. The digestion is then repeated with half an ounce of the same spirit, and the liquid again filtered whilst hot into a beaker-glass, containing a solution of carbonate of ammonia (twenty grains in sixty grains of water). The liquid having been covered with a plate of glass, is to be left undisturbed for twenty-four hours, when crystals will have formed on the interior of the glass. When examined by the microscope the crystals are found to consist of four-sided rectangular small prisms, small pearly scales and needles, and four-sided prisms. The crystals, therefore, are a mixture of morphia, narcotine, and meconate of ammonia. They are to be collected on a filter, the meconate of ammonia removed by repeated washing with distilled water; the crystals, together with the filter, dried on the funnel and treated with absolute ether, by which they are deprived of the narcotine. The morphia remains on the filter, and the narcotine is obtained by the spontaneous evaporation of the ethereal solution. By this method the author has discovered in opium 1.8 per cent. of morphia and one per cent. of narcotine.

In order to obtain an uniform tincture of opium, four ounces of Smyrna opium are to be introduced into a porcelain or tin cylinder, which can be closed with a cover, furnished with two holes, and twenty-four ounces of water are to be poured over it. The cylinder is then placed in a steam apparatus, and steam is conveyed into the liquid by means of a tube, which passes through one of the holes, nearly to the bottom of the cylinder. In the other hole a tube is fixed, which opens into a refrigerating apparatus. Steam is now allowed to pass through the mixture of water and opium, until twelve ounces of opium-water have passed into the refrigerating apparatus. The aqueous infusion is then strained through a cloth, the residue pressed, and the liquid filtered after deposition. The residue is then to be replaced in the cylinder, sixteen ounces of rectified spirit of wine are to be poured over it, and the mixture digested, at a moderate heat, for the night in the steam apparatus. The tincture having been expressed from the residue, is to be filtered, and the spirit of wine distilled off. The aqueous solution is then to be inspissated in the steam apparatus to the consistence of honey, and after having been mixed with the alcoholic extract, is to be dried at a moderate temperature. This extract contains every particle of the employed opium, which is soluble in water and alcohol. Two ounces of this dry extract are then to be dissolved in a mixture of ten ounces of rectified spirit of wine, and ten ounces of the opium-water, obtained during the preparation of the aqueous extract, and the solution filtered. In sixty grains of this tincture there are invariably six grains of extract of opium.

For the preparation of *Tinct. opii croc.*, the spices and the saffron are first digested with wine, to which the prescribed quantity of opium-water and dry extract are to be added.—*Pharm. Central Blatt*, April, 1850, No. 16, p. 245, and *Archiv. du Pharm.*

ON SOME TESTS FOR QUININE.

BY DR. VOGEL, JUN.

A VERY characteristic test for sulphate of quinine has already been pointed out by Brandes. It consists in mixing a solution of sulphate of quinine with chlorine-water, and then adding caustic ammonia, when the liquid strikes an emerald-green colour. Starting from this experiment, I have succeeded, by the use of some other reagents, in producing some highly-remarkable changes of colour in a solution of the sulphate of quinine.

If an excess of a concentrated solution of the ferrocyanide of potassium, instead of ammonia, is added to the solution, mixed with chlorine-water, a dark red colour is instantly produced, which persists some hours, but then passes into green, especially when exposed to the action of light.

This reaction is highly characteristic of quinine. If caustic potash is used instead of the ammonia, the solution acquires a sulphur-yellow colour. A solution of chloride of lime, mixed with muriatic acid, may be advantageously substituted for the chlorine-water, in which case a green powder falls on the addition of ammonia. As the above reactions do not take place with chinchonine, they may be considered as distinguishing characters of the two alkaloids.—*Liebig's Annalen*, Feb., 1850.

ON AFRICAN LEECHES.

BY DR. METTENHEIMER.

The so-called African leeches, recently imported, are distinguished from the Polish and Hungarian leech (*Sanguisuga medicinalis* and *S. officinalis*), and from all their varieties, by the beautiful light green ground colour, varying to a deep green, and often inclining to red; also by the black points often surrounded with red edges on the back, and by the broad streaks of a bright orange yellow colour, which are black towards the abdomen. The colour of the abdomen is similar to that of the Hungarian leech, but spotted. They agree perfectly with the description of *S. interrupta* of Moquin Tandon, and they suck very well. Another sort, which the author also received, under the name of an African leech, is rejected by the surgeons as bad. Its back is of a blackish copper brown, almost of a single colour, only the edges are somewhat lighter and with a black contour; the abdomen is dark green and spotted. This species might be mistaken for the horse-leech (*Hæmopis nigra*), if it were not that the back of the latter is much smoother, whilst the joints of the first are furnished with numerous projections, from which it appears not at all unlikely to be the *Sang. granulosa* of Lavigny.

Whether the species sold as *African leeches* are actually imported from Africa the author has not been able to ascertain; the dealers who provide the greatest part of Germany with them, state that they bought them partly at Trieste, partly at Lyons.

Dr. Buchner has compared some specimens of these leeches with the descriptions and representations of the various species and varieties of Hirudo or Sanguisuga given by *Brandt and Ratzebury* in their *Medical Zoology*, and also with the "*Naturgeschichte der für die Heilkunde wichtigen Thiere, by Dr. E. Martiny,*" but could not come to a decided judgment, whether the beautiful light green leech be actually the *S. interrupta* and the dark brown *S. obscura;* for according to the *Monographie de la Fam. des Hirudinées by Moquin-Tandon*, the *S. interrupta* is marked on the dark green back with six interrupted yellow or orange-coloured black spotted longitudinal streaks, with which agrees also the representation on table xxx., fig. 4, so that the orange-yellow and black spots are extended over the whole back. The green leech, however, of Dr. Mettenheimer has a light green, almost apple-green, back of one colour, and is marked only at the edges on each side with a row of black square spots and beautiful orange-red streaks. *S. obscura* has, according to *Moquin-Tandon*, a dark brown back, marked with six reddish longitudinal band-like stripes, hardly lighter in colour than the back itself, and the abdomen is light green with numerous spots. Many specimens have only irregular black spots at the back, which often are hardly to be distinguished from the very dark back, which, without having longitudinal streaks, is only marked with innumerable blackish and reddish spots. This latter criterion applies to the so-called African copper-brown leech, whose back is almost only of a single colour; but the light red edges which Moquin-Tandon mentions are certainly wanting in the specimen of Dr. Mettenheimer. Perhaps this is the same species which Pelletier and Hazard, and also Blainville, have described as *Sangsue médicale noire.*

Dr. Wagner, who also examined these leeches, gave the following opinion:—The beautiful light-green leech is the *S. interrupta*, which Moquin-Tandon saw, with several apothecaries, at Montpellier, and first described.

Whether the dark-brown leeches be *S. obscura* which Moquin-Tandon also found in the neighbourhood of Montpellier, I do not venture to determine. It appears to me to be a darker variety of the *S. interrupta*.

There are, however, found in Africa various species of leeches, which are partly used for medical purposes.—Buchner's *Repertorium*, 1850, No. 12, p. 376.

COMPARATIVE EXAMINATION OF ENGLISH AND RUSSIAN RHUBARB.

BY DR. MICHAELIS.

Dr. Michaelis, of Hohnstein, has made a comparative examination of English and Russian rhubarb, with respect to the proportion of rhein, bitter and astringent extractive, resin, oxalate of lime, and woody fibre contained in them. He first determined the sp. gr. of six pieces of each kind.

Russian (half and wholly trimmed pieces)	0.918	0.893	0.891	0.857	0.798	0.743
English	0.826	0.801	0.787	0.739	0.694	0.617

One very spongy piece had a sp. gr. of only 0.511. In general, therefore, English rhubarb has a less sp. gr. than the Russian. The greater sp. gr. of the latter sort depends on the larger proportion of oxalate of lime which it contains. The following table represents the results of the author's analysis of the two sorts:—

	Russian Rhubarb.			*English Rhubarb.*		
Sp. gr.	0.918	0.857	0.743	0.826	0.739	0.617
Rhein	4.3	3.8	3.2	5.3	4.9	3.1
Resin	10.3	8.5	8.1	4.7	5.8	4.6
Oxalate of lime	15.2	11.7	11.4	10.3	8.7	3.1
Extractive	14.7	13.5	22.6	32.3	39.5	26.9
Woody fibre	14.0	16.4	21.9	23.8	31.2	43.3

In English rhubarb the proportion of resin is smallest, of extractive the largest. In the Russian sort the proportion of oxalate of lime is considerably greater. In the English sort the rhein and woody fibre preponderate. According to the author, the purgative quality of rhubarb depends on the resin and oxalate of lime, and the tonic properties on the rhein and extractive matter; hence Russian rhubarb is more purgative than the English, while the English is more tonic than the Russian.—*Arch. d. Pharm.*, 2 R., bd. cix., s. 165—167.

COLLINS'S CHLORIDE OF LIME.

The specification of the patent granted to Mr. Robert Nelson Collins, of Oxford Court, Cannon Street, "for certain improved compounds to be used for the prevention of injury to health under certain circumstances," was enrolled on June 2d, 1849.

The nature of this invention consists in the forming of certain compounds which have the property of evolving or liberating chlorine, when they are moistened or mixed with water, and which compounds are therefore suitable to be used under certain circumstances, in which health would be liable to be affected, as in the case of noxious exhalations or emanations from various causes and sources, and which would be rendered innocuous by the application of chlorine. For the preparation of one of these compounds, the patentee directs the employment of chloride of lime, which is to be combined with a saline substance—the acid, united to the base of which, has a greater affinity for lime than for the base with which it is combined, and the presence of which base does not impede or prevent the liberation of chlorine. For this purpose, the patentee prefers the use of sulphate of alumina, the acid of which has a greater affinity for lime than for alumina. This sulphate of alumina, in the form of an anhydrous sulphate, is to be mixed with chloride of lime, in the proportion of one part of anhydrous sulphate, and two parts of chloride of lime, of thirty-four per cent., the strength usually met with in commerce—and the mixture so prepared stored in well-closed vessels.

This compound may be used for the prevention of injury to health, either by mixing it with animal or vegetable matters undergoing decomposition, as in manure, &c., or in open vessels, placed near such matters. In most cases, sufficient moisture is afforded, either by the decomposing substances, or by the atmosphere, otherwise water may be added, when a great evolution of chlorine takes place, and effectually prevents any contagious or noxious effects being given off by such decomposing substances.

The patentee states that chloride of magnesia may be substituted for chloride of lime, and that other salts of alumina, as well as the salts formed by the union of peroxide of iron, oxide of zinc, oxide of lead, and oxide of manganese, with sulphuric, nitric, and muriatic acids, may be employed, instead of sulphate of alumina, in which case such a quantity of the substance employed must be used as will contain a quantity of acid equal to the proportion of acid contained in the proportion of sulphate of alumina above directed to be combined with the chloride of lime.

The patentee does not confine himself to the employment of any one of these methods of preparing his compounds, nor to the proportions above mentioned, as there may be cases in which it would be useful to combine several of these substances together; so that the nature of his invention is fully carried out, which consists in combining together certain substances hereinbefore defined, so as to produce compounds which have the property of evolving or liberating chlorine, when they are moistened or mixed with water, and which are consequently suitable to be used for the prevention of injury to health, under certain circumstances.—*Patent Journ.*

OXIDE OF ZINC.

BY M. SOREL.

Some communications having been received at previous sittings of the Academy, containing observations tending to cast a doubt on the freedom from injurious consequences resulting from the employment of the oxide of zinc, M. Sorel stated, that the experience of fifteen years has demonstrated to him that the health of the workmen employed in working zinc or its oxides is not at all affected from this cause. "During fifteen years," says M. Sorel, "we have employed in our galvanization of iron establishments, several hundreds of workmen, a great number of whom have been for a long time occupied with powdering and sifting the grey or suboxide of zinc, with which we make our galvanic paint, and never have any of these workmen, who are often in the midst of a cloud of oxide, been ill, or complained from this cause. I would also affirm, that the white oxide is equally as innocuous as the grey oxide. We have manufactured the oxide of zinc on a large scale for several months, and although the workmen have often respired considerable quantities of oxide, they have not suffered the slightest indisposition therefrom.

ON THE REMOVAL OF SULPHURETTED HYDROGEN FROM SOLUTIONS.

BY H. ROSE.

When we have to determine the chlorine in metallic solutions, from which the metals are first to be precipitated by sulphuretted hydrogen, the latter must be expelled before the precipitation with a solution of silver can be undertaken. Heat is not practicable for this purpose, as the chlorine might easily be lost by it. In such cases Rose added sulphate or nitrate of copper. But here also a loss of chlorine takes place, since the precipitated sulphuret of copper takes up chloride of copper. This can, however, be avoided, by adding sulphate of iron to decompose the sulphuretted hydrogen, because then the sulphur only is precipitated; for this, after being washed, contains no chlorine. The chlorine is subsequently precipitated by a solution of silver.—*Poggendorff's Annalen*, and *Pharm. Central Blatt*, April, 1850; No. 17, p. 271.

ON THE BISULPHITE OF LIME.

BY MM. MENE AND PINCHON.

MM. Mene and Pinchon being desirous of trying the process of M. Melsens, for the manufacture of sugar by means of bisulphite of lime, could not in any way succeed in procuring this calcareous salt, although they carefully followed the methods indicated by the authors of different chemical treatises. They found that the bisulphite of lime of commerce is a mixture of slaked lime and of sulphite; that the sulphite is constant in its composition, and possesses a neutral reaction; that the bisulphite does not exist, or at least is not formed by means of any of the processes which, up to the present time, has been furnished; and, lastly, that neither baryta, magnesia, nor alumina are capable of affording bisulphites. The results, therefore, obtained by M. Melsens, hold good only when there exist free acids in the saccharine solutions, acids capable of determining the disengagement of the sulphurous acid of the neutral sulphite of lime.*

ARTIFICIAL PRODUCTION OF DIAMONDS.

The Paris correspondent of the *Atlas* makes the following announcement:—"The scientific world has been in a state of commotion for some time, in consequence of the publication of the discovery of the long sought-for secret of the fusion and crystallization of carbon. The Sorbonne has been crowded for the last few days to behold the result of this discovery in the shape of a tolerably-sized diamond of great lustre, which M. Despretz, the happy discoverer, submits to the examination of every Chemist or *savant* who chooses to visit him. He declares that so long ago as last autumn, he had succeeded in producing the diamond, but in such minute particles as to be visible only through the microscope, and fearful of raising irony and suspicion, he had kept the secret, until, by dint of repeated experiments and great labour, he had completed the one he now offers to public view. Four solar lenses of immense power, aided by the tremendous galvanic pile of the Sorbonne, have been the means of producing the result now before us. M. Despretz holds himself ready to display the experiment whenever it may be required. The diamond produced is of the quality known in the East as the black diamond, one single specimen of which was sold by Prince Rostoff to the late Duke of York for the enormous sum of £12,000!"

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* The preparation of bisulphite, or acid sulphite of lime, in solution, is described at page 298 (vol. ix.) of this Journal, on the authority of Liebig.—Ed. *Pharm. Journ.*

IMPROVEMENT IN MAKING MAGNETS.

Professor Faraday has recently exhibited at the Royal Institution, a magnet of great power, made by a new process. A magnet of the same description has also been submitted to the Academy of Sciences at Paris. These magnets are made by M. Logeman, optician, at Haarlem. The method adopted in their construction has not been made public, but it is said to be founded on the researches of M. Elias, of Haarlem. The force of these magnets is double that of magnets made in the usual way. The one exhibited at Paris weighed one pound avoirdupoise, and was capable of supporting 27½lbs. On placing a piece of letter-paper between the poles and the keeper it still supported a weight equal to that borne by the best magnets hitherto made.

ON A MODE OF DISTINGUISHING PAPER MADE FROM LINEN AND COTTON.

BY M. CESARECA.

M. **Cesareca**, of Havannah, states, in this communication, that the employment of caustic potash or soda is the best mode of ascertaining whether linen or cotton has been employed in the manufacture of any kind of paper, and recommends the use of the following process as a means of readily ascertaining the difference :—Boil the paper in a mixture of two ounces of caustic soda or potash, in a quarter of a pint of distilled water ; the paper made with linen remains unacted upon, whilst that made of cotton is reduced to a pulpy mass. This alkaline liquor also furnishes a means of distinguishing cotton and linen fabrics, and their admixtures.

PROTECTION OF ELECTRIFYING MACHINES FROM DAMPNESS.

To protect electrifying machines from dampness, Münch recommends us to draw from the centre of both of the surfaces of the glass-disk towards the periphery, a line with grease, by which the disk on being turned, becomes covered with a thin coating of fat, and is thus protected against contact with damp air. The insulating glass feet of the machine may also be thus protected by drawing on them a line with grease, and spreading it with a cloth. The machines can then be worked even in damp weather.—*Pharm. Central Blatt*, 1850, No. 12.—[The same effect is obtained by covering the glass surfaces with a film of some volatile oil, as oil of cloves.—Ed. *Pharmaceutical Journal.*]

MARBLING MATERIALS.

Four parts of resin and one part of wax having been previously melted together, six parts of a hot solution of glue are added, and after this four parts of powdered alum, with twelve parts of powdered gypsum. Colour the composition to pleasure, stir in a quantity of refuse silk [*Seidenabfälle*] and pour in moulds. The surface assumes then a veiny appearance. The walls of rooms may thus be decorated, if the cement be mixed with the refuse of silk instead of with cow-hair.—*Pharm. Central Blatt*, 1850, No. 12.

ON QUINOIDINE.

BY R. LEHMANN AND E. VOLLAND.

R. **Lehmann**, a pharmaceutist of Prenzlau, has examined quinoidine, two drachms of which being treated with alcohol, left a residue of one-third. Of this undissolved portion, water took up two-thirds, consisting of sulphate of soda and sulphate of potash. In the last undissolved residue, a considerable quantity of copper was discovered. Sulphuric acid dissolved the remainder, with the exception of five grains of earthy matter. The alcoholic extract contained no copper.

A second specimen of quinoidine left, on being exhausted by alcohol, a calcareous residue, which formed a sixth part of the whole quinoidine. This residue was insoluble both in hot alcohol and in water, but was dissolved by diluted sulphuric acid. The filtered solution on evaporation yielded crystals, and a dark precipitate, which precipitate always reappeared when the solution ceased to have an acid reaction. The crystals appeared to be sulphate of cinchonia, from which, however, quinia was obtained by means of ether. From two other sorts of quinoidine, the author obtained inconsiderable residues of sulphate of potash and soda, phosphate of soda, ammoniacal salts, and lime. One specimen also yielded a trace of copper. The variations in the qualities of commercial quinoidine gave rise to much inconvenience, as medicines prepared with them are not uniform in their appearance. Thus the author often received prescriptions ordering *Tinct. chinoidini c. aq. menth. pip. et acid. sulph. dil.*, the latter in a small quantity; and also *Tinct. et aq. menth.* in such proportion, that precipitation must take place. This happened with every tincture prepared with fresh quinoidine. Sometimes the precipitate settled at the bottom, sometimes it remained for a length of time at the surface, and adhered gradually everywhere; at one time the mixture was dark-brown, another light-brown, and sometimes brownish-white, almost milky.

E. Volland examined a sort of quinoidine which was adulterated with a large quantity of pine-resin. One hundred parts contained:

Quinoidine	48.334
Resin	43.333
Matter insoluble in spirit of wine	8.333
	100.000

The author found by direct experiments, that equal parts of quinoidine and pine resin very easily combine. The commercial quinoidine in which this adulteration was discovered, consisted of a four-sided prism, half a foot long, and weighing one pound. It was not so dark as that usually met with, and had a tinge of green. It was very brittle, and a small piece, kept in the warm hand, became soft, but with difficulty, whilst genuine quinoidine becomes so soft in the hand that it can be moulded. In spirit of wine it dissolved, leaving but a small residue; in diluted sulphuric acid the residue was considerable, and melted in a porcelain capsule, forming a dark brown resinous mass, which, on being heated in a platina spoon, evolved an odour at first slightly of carbonizing quinoidine, but afterwards like strongly heated rosin or pitch, and on igniting the vapours it was consumed with a strongly sooty flame. After incineration, scarcely any residue was left. This quinoidine is said to have been imported from Bavaria.

Two other sorts of quinoidine, one from England, the other from Basle, were examined by Volland. The first was darker than the usual quinoidine; small quantities of it held for some time in the warm hand, became soft and shapeable, even more so than is the case with good dry quinoidine. In alcohol and diluted sulphuric acid, it was dissolved with only a slight residue. The filtered solution of half a drachm of this quinoidine in diluted sulphuric acid, gave by precipitation with carbonate of soda by heat, twenty-eight grains of dry quinoidine=93.333 per cent. Ether dissolved 73.33 per cent. The residue not dissolved by the ether, was treated with water, and then with spirit of wine, by which 17.5 per cent. more were dissolved, and a residue of about four per cent. insoluble in these solvents remained behind.

The other sort, from Basle, had the consistency of a thick extract, a blackish-brown colour, and appeared to be the inspissated mother-liquor obtained in the preparation of the sulphate of quinine.—*Pharm. Central Blatt*, 1850, No. 12.

CONSUMPTION OF SPIRITS IN THE UNITED KINGDOM.

According to a return recently made, the total number of gallons of proof spirits distilled in the United Kingdom during the year ending January 5, 1850, was 24,775,128, distributed among the three kingdoms thus:—England, 5,573,411 gallons, of which 5,365,600 were from malt with unmalted grain, 17,337 from sugar or molasses with unmalted grain, 13,941 from sugar, and 176,533 from molasses; Scotland, 10,846,634 gallons, of which 6,058,086 were from malt only, and 4,788,548 from malt with unmalted grain; Ireland, 8,355,883 gallons, of which 85,756 were from malt only, 8,047,077 from malt with unmalted grain, and 222,250 from sugar or molasses with unmalted grain. The number of gallons of proof spirit on which duty was paid for home consumption in the United Kingdom was 22,962,012, the total amount of duty being £5,747,218 1*s.*, distributed as follows:—England, 675,036 gallons from malt only, 8,166,226 from malt mixed with unmalted grain, 14,740 from sugar, and 177,052 from molasses; total, 9,053,676 gallons, on which £3,546,023 2*s.* duty was paid, at the rate of 7*s.* 10*d.* per gallon; Scotland, 4,950,736 gallons from malt only, 1,984,115 from malt mixed with unmalted grain, and 152 from sugar; total, 6,935,003 gallons, on which the duty, at 3*s.* 8*d.* per gallon, amounted to £1,271,417 4*s.* 4*d.*; Ireland, 452,468 gallons from malt only, 6,404,770 from malt mixed with unmalted grain, 112,308 from sugar or molasses with unmalted grain, and 3,787 from sugar; total, 6,973,333 gallons, yielding, at the rate of 2*s.* 8*d.* per gallon, an amount of duty equal to £929,777 14*s.* 8*d.*

The total number of gallons of proof spirits imported into England in the year ending January 5, 1850, from Scotland, amounted to 2,651,529 gallons, of which 673,342 were distilled from malt only, and 1,978,187 from a mixture of malt with unmalted grain; and the total amount of duty paid thereon, at the rate of 7*s.* 10*d.* per gallon, was £1,038,515 10*s.* 6*d.*, being £513,330 8*s.* on removal from bond, and £525,185 2*s.* 6*d.* after arrival at the place of destination. The number of gallons imported from Ireland was 890,021, of which 1,694 were from malt only, 884,772 from malt with unmalted grain, 3,285 from sugar or molasses with grain, and 270 from sugar; and the total amount of duty paid was £348,591 11*s.* 2*d.*, being £118,912 7*s.* 6*d.* on removal from bond, and £229,679 3*s.* 8*d.* after arrival at the place of destination. The number of gallons imported from Scotland into Ireland was 766,405, of which 396,064 were from malt only, 370,205 from malt mixed with grain, and 136 from sugar, the amount of duty paid, at the rate of 2*s.* 8*d.*, being £102,187 2*s.* 4*d.*, levied after arrival at the place of destination. The quantity imported from Ireland into Scotland was 12,580 gallons, of which 12,428 were from malt with grain, and 152 from sugar, and the duty paid thereon, at the rate of 3*s.* 8*d.*, amounted to £2,306 6*s.* 8*d.*

THE COMMISSIONERS OF SEWERS—THEIR SANITARY EXPERIMENT.

After a protracted season of apathy and torpor the Metropolitan Commissioners of Sewers have at length resolved to contribute their quota to the festivities of the season, and have turned out in force for a field-day. The site chosen for their "Exposition of Industry" evinces the greatest confidence and judgment. In the very heart of official London, under the walls of the Houses of Parliament and the Abbey, before the eyes of

Ministers, Senators, and Judges, and within easy scent of Downing Street and Whitehall, they have fairly broken ground and commenced the investment of her Majesty's lieges. The latest particulars obtainable respecting the preparations for the entertainment will no doubt be generally interesting. At the corner of the grass-plot in Palace Yard there stands a capacious square chimney just erected, and on the ground there lies a monster twice as large and almost as lively as the young hippopotamus, painted all green and red, and obviously possessing, as a bystander remarked to us, "no end of work in him." This is the boiler of the new steam-engine, the smoke of which is to be provided for by the square chimney, and the keeper whereof is to reside in a snug little tenement adjoining, like the Arab boys in the Regent's Park. The performance will consist in the extraction and elevation, by means of this steam-engine, of the concentrated essence of Westminster sewage, which will be first collected in a cesspool, and thence distributed in tubes over certain favoured districts of Whitehall, on its way to the Thames. The official programme contains a modest disclaimer of the full merit of the exhibition, and intimates that the specimen extract will "not be, properly speaking, sewage water, but merely a sort of oozing from cesspools and dead bodies." No doubt, however, it will be an effective substitute for the genuine article, and be favourably received by an indulgent public.—*Times.*

ROYAL INSTITUTION.

The last of the Friday evening meetings for the season was held on June 7th, when Mr. Faraday gave a lecture "On certain Conditions of Freezing Water." He commenced by stating, that although the subject might appear a familiar one, he should have to communicate facts, some of which were new, and others but little known, partly the results of his own observations, and partly those of others.

He first pointed out the strong affinity which water appears to have for many other bodies, which was illustrated by showing the great avidity with which it is absorbed by anhydrous sulphate of copper, the phenomenon being accompanied by the disengagement of much heat. This, he stated, was but one of numerous instances which might be adduced in illustration of the point alluded to. On the other hand, it is found, that when water is frozen, it is thereby eliminated from substances with which it was previously closely associated. Thus, for instance, the ice formed in sea-water is perfectly free from saline matter, and some of the ice now largely imported to this country from North America and from Norway, although formed in lakes, the waters of which are not pure, afford, when carefully thawed, the purest specimens of water that can be obtained by any process. Professor Faraday's attention had been directed to this subject some time ago in his attempt to get transparent lenses of ice, for however carefully the water was freed from air by boiling before freezing it, bubbles of air were always given out in the act of congelation. In subsequently examining the ice from the North American lakes and from Norway, he found that it was perfectly free from air and from all foreign bodies. The elimination of water in the act of freezing was more complete and perfect than had generally been supposed, in proof of which several very interesting experiments were performed. A solution of indigo in sulphuric acid was added to water so as to give it a deep blue colour, and some of this solution, contained in a test-tube, being immersed in a freezing mixture until it was partly congealed, it was found that the ice thus formed contained neither colouring matter nor acid. In performing this experiment, however, it was found necessary, by particular management, to prevent the sulphate of indigo from being mechanically retained within the ice, and this was effected by constantly brushing over the surface of the ice as it was formed against the sides of the tube with a feather. To the absence of some means for effecting this object, was ascribed the impurity of the ice formed in our ponds, and the greater purity and transparency of the icicles formed by waterfalls was referred to the influence of motion. Water mixed with ammonia was also shown to be entirely deprived of the ammonia, when frozen in the manner described, notwithstanding the powerful affinity those substances have for each other. In alluding to the great purity of the ice brought from North America and from Norway, Mr. Faraday said he was unable to assign a reason for the absence of all foreign matter in those cases. Having found that pure ice is entirely free from air, he some time ago suggested to M. Donne, of Brussels, that ice melted under oil would afford a good means of testing the truth of his theory, that water when entirely free from air boils with explosive bursts of steam. The experiment was tried, and fully realized his anticipations. In conclusion Mr. Faraday alluded to the fact recently noticed by Dr. Thomson, that the freezing point of water and the thawing point of ice are influenced by pressure.

REVIEWS.

ELECTRIC TELEGRAPH MANIPULATION. By CHARLES V. WALKER, *Superintendent of Electric Telegraphs to the South-eastern Railway Company.* Knight and Sons, Foster Lane.

THIS is a very well written, well illustrated, and interesting, popular account of electric telegraphs, by one who, from his long practical acquaintance with the subject, and his official position, possessed many facilities for furnishing correct details. The subject, which is discussed in 107 duodecimo pages, is brought within the comprehension of the unscientific reader; yet the statistical and other practical and descriptive information which is given, renders the work interesting to the man of science, in common with that more numerous class, who, observing the wires stretched beside the railways, wonder how knowledge is made to travel through such long and narrow lines.

Having described the mode of transmitting currents of electricity through the wires, and the influence of these currents upon magnets placed in their vicinity, which thus constitute galvanometers, the author gives the following description of the working part of the apparatus employed:—

"TELEGRAPH INSTRUMENT.—Having studied the properties of the Galvanometer, and described the structure of such as have been employed in our English telegraphs, we are prepared to examine the mode of mounting them for use, and to look into the mechanical adjustments, by means of which the voltaic force is rendered subservient to our will, to produce such and so many galvanometric deflections, as shall serve our purpose; and to produce them rapidly.

"The instruments to be described are the inventions of Messrs. W. Fothergill Cooke and Charles Wheatstone, F.R.S. They are of two kinds: the one, in which a single galvanometer is employed; the other, in which there is a pair of galvanometers. The former will serve our present purpose, as the mechanical adjustments of the latter are merely the double of this. I have removed the case from the instrument in order to give a clear view of all the essential parts; and have engraved a back view of it (fig. 3) with the battery E attached as if for use; and the

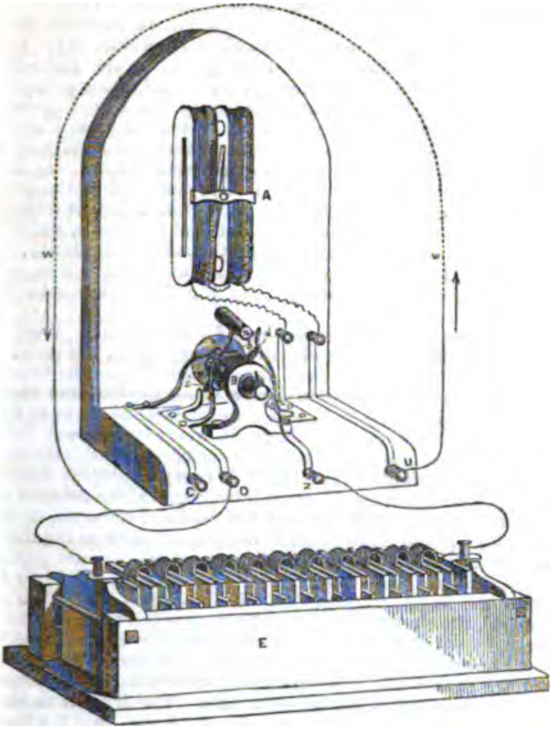

FIG. 3.

circuit of the galvanometer A completed by the wire W W. The front view is given elsewhere (fig. 15, § 104).

"24. The instrument is possessed of a two-fold character; it is *passive*, or ready for receiving signals from another instrument; it is *active*, or ready for transmitting signals to another instrument. By describing first how it is fitted for *receiving* signals, and then how it is arranged for *transmitting* them, we shall be better able conveniently to analyze it, and to comprehend its general structure. The frame of the coil B is of brass, or (which is in many respects better) of polished wood or of ivory; it is screwed upon the face of the instrument, which face is a brass plate varnished on the inner side. Looking at the coil, a short wire from its right-hand end comes to a screw terminal, which latter, by a slip of brass neatly laid on the instrument case, is connected with another terminal U. The left-hand end of the coil comes also to a terminal, from which a slip of brass descends to a brass plate here partly hidden; but its form may be gathered from a similar plate, visible on the left side. These twin plates are in metallic connection by means of the two upright springs, plainly shown in the drawing. The springs are of stout steel, and press strongly on two points in a short insulated brass rod x, which is screwed into the wooden framework of the instrument. The left-hand plate is connected with the terminal D, also by a slip of brass. If now, the two terminals U and D are connected by a wire W W, the circuit will be complete, as follows: from the terminal U into the coil at the right-hand side; out of the coil, at the left side downwards to the right-hand plate; up the right-hand steel spring, across the brass rod *n* to the left-hand steel spring; downward by this spring to the left-hand plate, thence by the slip of brass to the terminal D, and thence by the wire W W to the terminal U, whence we started. If now the wire from U went up the line of railway, and the wire from D down the line, and the circuit were in some way kept complete on the large scale, as it has been here described on the small scale, any electric current passing along the wire from a distant station, would traverse this coil in its course, and would deflect the needle, and so make a signal. I should here mention that, for the sake of regularity, we adopt one unvaried order in attaching wires to the instrument; it is, to put the upwire on the terminal, shown by U in the figure, the coils being all uniformly wound.

"25. So far for receiving a signal—now for sending one. Were we to go out on the open railway, taking with us a battery (§ 7), and to cut any one of the wires, and place its two ends, thus obtained, upon the two terminal ends of the battery, a current would pass along the line, and the needles on that wire would be deflected; and if we changed hands so as to reverse the connections, the deflections of the needle would be reversed. The same would happen were we to cut a wire inside the office, or inside the telegraph, and to treat it in a similar way. Now, in every apparatus contrived for transmitting signals, we have a *place corresponding to such a cut wire;* and near this place are the poles of the battery, mounted and movable, so that they may be readily applied in the breach, one way or other as required. The place here (fig. 3) is the top of the springs. They are not *joined* to the brass rod *n*; but, as I said before, *press hard* upon it, and can readily be raised with the finger, or otherwise. It is obvious that, when either of them is raised, the circuit is broken. Now, near this place is a mechanical contrivance, by which the poles of the battery may make a breach in the circuit, and be applied in the breach in either direction. The drum B is of box-wood, the ends *c* and *z* being capped with brass, and insulated from each other by the wood, *b*, left between them. The drum is movable by a handle, not in sight here, but visible in fig. 15 (§ 104), and is supported as shown in the present figure. A stout steel wire *c'* is screwed beneath into the *c* end of the drum; and a similar wire *z'* is screwed above into the *z* end. These two wires are the poles of the battery, *z'* being connected with the zinc end, and *c'* with the copper thus:—from the copper end of the battery a wire is led to the terminal C; thence a slip of brass leads to a curved brass spring which presses closely on the drum at *c*; from the zinc end of the battery a wire goes to the terminal *z*, and thence a slip of brass leads to a similar curved spring, pressing on the continuation of the *z* end of the drum, as shown in the figure. It will be seen that, whenever the drum is moved, the steel wire *z'* will lift up one or other of the upright steel springs; it is now lifting up the right-hand one, and so breaks the circuit; but, by a little further motion of the drum, the wire *c'* will press upon the boss below, as shown in the figure, and thus there will be a battery pole on each side of the breach, and a signal will be made on this, and on all instruments connected with it. And, from the peculiar arrangement of the drum, the motion can be changed as rapidly as the hand can move. I have shown the battery connections exactly as they occur in practice; and the connections are such that, if the right-hand spring is moved off, the needle moves to the right, and, if the left, to the left. The needle on the face of the instrument always has its north end upward, and the needle within the coil its north end downward, so that, by the law I have elsewhere stated (§ 11), if we look at the face of an instrument, and see the top end of the needle move to the right, we may be sure that in the half of the coil nearest to us the current is *ascending*."

Thus the wires are the channels through which electric influences are conveyed to great distances with inconceivable velocity, and the movable magnets, or galvanometers, to which the wires are attached at the stations, are the parts of the apparatus by which signals are made. The mode of interpreting these signals is thus described by the author :—

" 90. DOUBLE-NEEDLE CODE.—Having described the apparatus and means employed for producing at pleasure the transmission of signals to distant places, it now remains to us to explain the manner of interpreting these signals, so that each person shall understand the ideas the other would convey.

" We have to describe how, out of only *two* needles, each of which has but *two* movements, the telegraph alphabet is formed. On the face of the instrument are the letters of the alphabet, arranged, as it will be seen, *seriatim* in two lines, beginning at the left, and ending at the right, as in writing. The commencing series from A to P is above the top end of the needles ; and the concluding series from R to Y below the bottom end. It will also be seen that some letters are engraved *once*, some *twice*, and others *three* times. To make a letter engraved once, requires *one* motion of the needle ; to make one engraved twice, *two* motions of the needle ; and to make one engraved three times, *three* motions. In respect to the UPPER row, the needle *nearest* to the letter is moved, and it is moved so as to point *towards* the letter. In respect to the LOWER row, *both* needles are moved, and their *lower* end is made to point in the direction of the letter required. Six of the letters, C, D, L, M, and U, V, require a twofold motion of the needle or needles, first to the right then to the left for C, L, and U, and first to the left then to the right, for D, M, and V. These six letters are engraved *intermediate*, and with a double arrow between. The alphabet produced by this arrangement is of a simple character, and is very readily acquired. To the stranger it appears confused ; but when he has the key to it, the difficulty disappears ; it might at first sight appear that a dial instrument—a telegraph, that is, provided with alphabets engraved on a circular dial, and an index made to revolve, and point to any required letter, is more simple. Several such telegraphs exist, and among them are some very happily arranged ; and there is something so simple in the fact of being able to point to any desired letter, that it is no wonder the public generally may, on a hasty glance, and before studying the practical merits of the case, be ready to decide in their favour, and prefer them to any other plan, the A, B, C of which is less obvious.

" 92. But is it such a *very* serious matter to learn another alphabet? Every schoolboy, now-a-days, knows some half-dozen alphabets : there are ROMAN letters large, and ROMAN letters small ; *MANUSCRIPT* letters large, and *manuscript* letters small ; Old English large, and *Old English* small ; GREEK large, and *Greek* small, and so on, and all different, and not one of them in which the letters are represented by so few *strokes of the pen* as are the telegraph letters by *beats of the needle*. Take one of our plainest alphabets as an example ; the ROMAN CAPITALS, for instance, and place a few of them in juxta-position with the corresponding telegraph signals:—

A \\ E / G ///
B \\\ F // H \

"93. The simplicity of these symbols is obvious. Two diagonal and one horizontal line are required for the Roman A ; two diagonal lines for the telegraph A ; one vertical and three horizontal lines make the Roman

E; one diagonal the telegraph E, and so on; the difference being that all the world have learned the Roman alphabet, but only a chosen few have studied the telegraph symbols. That the latter really are simple and distinctive; that they are full of meaning and very legible; that they are applicable to ordinary language, and good, ay, very good! no one will for a moment doubt, who has seen the rapidity and accuracy with which a telegraph officer receives a dispatch.

"94. To one who sees a telegraph in operation for the first time, the effect borders on the marvellous; setting out of the question the fact that the needles are caused to move by an individual perhaps a hundred miles off; the motion of the needles hither and thither, quicker than the untrained eye can follow; the want of all apparent order and rule in their movement; the ringing of the changes between one and the other, and both; the quiet manner in which the clerk points his needle to the letter E, in rapid intervals, implying that he understands the word; while, to the uninitiated looker-on, all is wonder, and mystery, and confusion; and the rare occurrence of the clerk pointing to ✠, implying he did *not understand*; and, finally, the quiet manner with which the clerk tells you, very coolly, as the result of his operations, "That the very pretty girl, with bright blue eyes and long curls, *has* sailed for Boulogne in the *Princess Clementine*, now leaving Folkstone Harbour; and that she *is* accompanied by the tall, handsome man, with the dark moustache and military cloak." As he tells you this, and says, "Message and answer, forty words two rates at 10*s*. 6*d*., one guinea, porterage a shilling—one pound two." If you happen to be the papa of the pair of blue eyes, you are bewildered, and wish you were an electric current, and could be sent after them."

This little book cannot fail to have, as it deserves, a very extensive circulation.

TEMPERANCE AND TOTAL ABSTINENCE; *or, the Use and Abuse of Alcholic Liquors in Health and Disease.* By SPENCER THOMPSON, M.D., &c. &c. London: John Churchill, Princes Street, Soho. 8vo, pp. 184.

THIS is one of the prize essays which, in the opinion of the adjudicators, ranks next in merit to that of Dr. Carpenter, noticed last month. It appears to be written without bias or prejudice. In this respect it differs from the work for which the prize was awarded. The general tenor of the conclusions at which the author has arrived may be gathered from the following observations in the Preface:—"Those doctrines which denounce alcohol and alcoholic liquors in any form, as poisons unsuitable and hurtful to man at all times and under all circumstances, are certainly not supported, either by reasonable experience or by chemical, physiological, or medical science; neither are they likely to win the assent of the more intelligent portion of the community generally, and certainly not of the great body of medical men, who daily meet with facts which contradict the assertions of the enthusiastic supporters of the cause. At the same time, whilst few belonging to the medical profession will be found to give their adherence to the ultra doctrines of total abstinence, no class of the community can be so practically alive to the terrible evils inflicted on mankind by the abuse of alcoholic stimuli, and none ought more sedulously to guard against all that can encourage that abuse or unnecessary employment."

The author is of opinion that alcoholic liquors are not necessary as a part of the ordinary sustenance of healthy man; that severe bodily exertion may be borne without the aid of this stimulus, which, in some cases, has been found to diminish the power of endurance. But, he observes, that constitutions differ so much that no absolute rule can be laid down, and that mischief has not unfrequently been done by the bigotted adherence to total abstinence principles and the endeavour to subject all persons alike to this rigid regimen. He points out the classes of cases in which alcoholic stimuli may be beneficially used in diet or medicinally, and those in which they should be avoided.

The chemical and physiological action of alcoholic liquors in a diluted or more concentrated form are described, and the morbid results arising from intemperance. This latter portion of the subject is treated at some length, and the horrors of drunkenness are depicted in a forcible manner. Among other facts it is stated, that while the average rate of mortality, among healthy persons in the prime of life, is about eight or ten in 1000, it has, in the Temperance Provident Society, averaged only four per 1000; and that intemperance constitutes the immediate cause of one-seventh of the cases of insanity contained in our English asylums. In some asylums the proportion is much larger.

A MANUAL OF ELEMENTARY CHEMISTRY, *Theoretical and Practical.* By GEORGE FOWNES, F.R.S. Third Edition, pp. 605. London: John Churchill.

HAVING reviewed the former editions of this work, it is needless to recapitulate. The author, anxious to bring the information the work contains, up to the present state of chemical knowledge, was engaged in its revision until within a few hours of his decease. He succeeded in accomplishing his task, with the exception of a small portion of the Organic Chemistry, namely, that relating to the animal kingdom. This has been completed by his friend Dr. Bence Jones, who has also revised the entire work during its progress through the press. In the absence of the lamented author, it could not have been in better hands, and we are glad of the opportunity of recommending the work as a text-book to the student in Chemistry—the one which is in general use in the laboratory of the Pharmaceutical Society.

EXPERIMENTAL RESEARCHES IN ELECTRICITY (Twenty-third Series) *On the Polar and other Conditions of Diamagnetic Bodies.* By MICHAEL FARADAY, D.C.L., F.R.S., &c. From the *Phil. Trans.*, 4to, pp. 20.

PHYSICIAN AND PATIENT: *a Practical View of the Mutual Duties, Relations, and Interests of the Medical Profession and the Community.* From the Text of WILLIAM HOOKER, M.D. Edited by EDWARD BENTLEY, M.D., &c. Pp. 302. London: Richard Bentley, New Burlington Street.

THE SUMBUL; *a new Asiatic Remedy of great Power against Nervous Disorders, &c. &c. With an Account of its Physical, Chemical, and Medicinal Characters, &c.* By A. B. GRANVILLE, M.D., F.R.S. Pp. 40. London: John Churchill.

TO CORRESPONDENTS.

H. (M.P.S.)—The following is the analysis of Fachingen water by Bischoff:—

	Grains of Anhydrous Ingredients in One Pound Troy.
Carbonate of soda	12.3328
" lime	1.8667
" magnesia	1.2983
Subphosphate lime	0.0061
Sulphate soda	0.1267
Chloride sodium	3.2337
Silica	0.0657
	18.9300
Carbonic acid gas in 100 cubic inches	135.

M. P. S.—Different specimens of opium vary so much in the proportion of morphia they contain, that the relative strength of the preparations o morphia and of opium cannot be defined with any degree of accuracy. We have an article on this subject in course of preparation for insertion next month.

Spes.—Both specimens appear to be good. The whitest is probably the best.

W. S. (Birmingham.)—The separation may probably be effected by distillation.

Hermes.—Mr. Savory, of Bond Street, has, we are informed, imported a supply of sumbul root.

Pittacus.—The milky appearance of the mixture alluded to would be occasioned by the insolubility of the essential oils of the sal volatile in the other ingredients.

A. P. S. (Bedford.)—The salts usually sold as Preston Smelling Salts consist of carbonate of ammonia, moistened with strong solution of ammonia, to which some essential oils have been added, according to fancy.

M. P. S. (Manchester.)—(1.) We are not aware of any work treating specially on the subject.—(2.) No.

A Reformer (Manchester), will find in another part of this Journal an account of proceedings of the nature to which he alludes, at Liverpool. We should be extremely glad to promote a similar movement in Manchester.

Enquirer.—See vol iii., page 66.

Another Enquirer.—Amorphous quinine is much cheaper than the crystallized sulphate of quinine, being an impure product. See vol. vi., page 163.

J. H. (Sudbury.)—The preparation alluded to is the Unguentum Cretæ Comp. of the London Pharmacopœia.

P. B.—The Hunterian Museum, at the College of Surgeons, is not open to members of the Pharmaceutical Society; but any member of the college may give an order for admission.

A. B. C. (York.)—The Council would have been justified in subscribing to the great Exhibition of 1851, as being calculated to promote the advancement of the art and science of Pharmacy. In order to meet any possible objection, the proposition was submitted to each member by circular, and the amount voted at the annual meeting.

M. P. S. (Bedford Street.)—The communication has been received with its enclosure.

Argentum.—There will be an article on the subject in the next number of this journal.

Lavatus.—We have not forgotten the subject, but it has been deferred for reasons which will be explained.

CAUTION TO CHEMISTS.—We are requested to caution the trade respecting a man who obtained two ounces of the essence of lemon and 1*s.* 6*d.* from Mr. Belton, Chemist, 27, Great Tower Street, City, about 6 10 P.M., the 21st of June, stating that he came from Mr. Barclay, Chemist, Little Tower Street, which is untrue. He is about eighteen years of age, five feet four or five inches high, dark hair and complexion, slim built; dressed in a black dress coat and black silk neckerchief. He can be identified. We are informed that he is in the habit of obtaining goods under false pretences from Chemists in this manner, using the names of other Chemists to obtain credit.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the EDITOR, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. II.—AUGUST 1st, 1850.

PROPOSED CHANGES IN THE SOCIETY OF APOTHECARIES.

ABOLITION OF THE APPRENTICESHIP SYSTEM.

In a memorial to the Secretary of State, dated June 26th, the Society of Apothecaries suggest for his consideration certain changes in the constitution and regulations of that body, which, if approved, are intended as the ground-work of an amended Act of Parliament.

The proposed changes are of a liberal character, comprising an extension of the class from whom the court of examiners are elected; an improved system in the examinations; the admission of graduates of British universities and colleges, and army and navy surgeons to the licence of the Society, without examination, under certain conditions; a registration of all licentiates; and the abolition of the apprenticeship system.

With the exception of the latter subject (the apprenticeship system) the proposed alterations refer to medical matters which do not concern our body, and we merely give an outline of the entire plan as affording a *possible* means of facilitating an arrangement of one portion of the Medical Reform Question. So long as general practitioners continue to practise Pharmacy, the Society of Apothecaries appears to be an appropriate body from whom to obtain the licence; and it would be more easy to improve and modify that institution to suit the exigencies of the present time, than it would be to found a new college. A compromise is better than a defeat, and a partial reform is better than none. Each section of the profession might, in this manner, promote the general improvement by commencing the reform at home. With this suggestion we dismiss this part of the subject.

With regard to the apprenticeship system, the memorial states—

"No person is admissible for examination under the present Act who has not served an apprenticeship of five years to an Apothecary. The Society propose that the service of an apprenticeship shall be no longer compulsory on the student."

The evil of the present system is continually felt by Chemists as well as medical men.

If the parents of a youth propose to bind him to a Chemist, as a step preliminary to a medical education, they are told that this would not answer the purpose, as the law declares that his master must be an Apothecary. The Chemist may have as good or even superior opportunities for teaching the rudiments of a medical education—namely, Pharmacy, he may be willing to allow the privilege of attending lectures, he may be a friend or relation of the youth, and likely to take especial interest in his welfare. These advantages go for nothing—the law is imperative, and the negociation is broken off.

A young man having served his time, or part of it, with a Chemist, desires to become a medical practitioner. He is beyond the age for serving another apprenticeship, and has acquired as much experience as the dispensary of an Apothecary would afford; the object contemplated in an apprenticeship has been attained, but not in the prescribed way. He is frustrated in his wishes, and must either continue a Chemist against his will or evade the Apothecaries' Act.

The methods in which the Act is evaded are various. Sometimes *nominal* apprenticeships are served; that is to say, indentures are regularly executed, while the education is derived from another source. Sometimes indentures are antedated, being merely a legal fiction. In other cases practitioners who are fully qualified to pass the examination, but excluded on account of the apprenticeship disability, are obliged to be content with the diploma of the College of Surgeons, and establish themselves as Chemists and Druggists.

The evils belonging to the apprenticeship system are too notorious to require further illustration. In the regulations of the Pharmaceutical Society, the abuse is purposely avoided. An apprenticeship is not necessary; but the object is attained by requiring a period of time equivalent to an apprenticeship to be occupied in a similar manner.

The memorial contains a reply to an objection which has frequently been raised against the Society of Apothecaries, which is as follows:

> "With respect to the objection that the Society of Apothecaries is a trading body, much misapprehension exists. The Society in its corporate capacity is not a trading body, nor are the individual members of which the Society is composed, united in the prosecution of a joint trading. No portion of the funds or property of the corporate body is embarked in trade; and no individual member of the corporation, in his character of a member of the corporation, is, or can be benefited, directly or indirectly, by the operations which are carried on at Apothecaries' Hall. The facts are these:—Within a few years after the incorporation of the Society, certain of its members, finding great difficulty in purchasing unadulterated drugs in the market, formed a plan for supporting a Dispensary of their own at Apothecaries' Hall. This was followed in 1676 by the formation, by subscription, of a Chemical Laboratory, for the purpose of supplying the subscribers with such chemical preparations as they might require in their medical practice as Apothecaries; and it appears that the supply was accordingly for some years confined to the subscribers and to the other members of the Society. This restriction, however, was afterwards removed, and the public were permitted to purchase such preparations as they might require. In progress of time the undertaking extended itself; and at the present day, the Navy, the East India Company, and numerous public institutions, derive their supply of drugs and chemical preparations from the laboratory at Apothecaries' Hall. The capital, however, with which this undertaking is carried on, is provided by a *limited* number of individual members of the Society, who are, in fact, associated together in partnership (undoubtedly under the partial controul of the corporate body); but the number of such partners is considerably less than the number of the members of the Society at large; and the profits arising from the undertaking are, of course, divided among the individuals composing the partnership, and not among the members of the Society generally.
>
> "The real answer, therefore, to the objection is, that the Society is *not*, as a public body, engaged in trading operations, nor are the individual members of the Society, whose capital is embarked in the undertaking I have described, traders, in the sense of men who devote their *personal* time and energies to the prosecution of a trade; but they are individuals who, being themselves engaged in the practice of the medical profession, are at the same time promoting, through the agency of competent officers, an undertaking which has for its object the production and supply of the various remedial agents of which the medical practitioner avails himself in his treatment of disease."

This explanation might have been more concisely expressed thus—

Apothecaries' Hall is the nut. All the Licentiates are entitled to the shell, but only the Members participate in the kernel.

THE RELATIVE POSITIONS OF MEDICAL AND PHARMACEUTICAL REFORM AT THE PRESENT TIME.

It has been our object for the last ten years to promote the elevation of the Pharmaceutical Chemist in this country to his right position. This sentiment has always been our text; and our arguments, although at first somewhat theoretical in regard to Pharmacy in Great Britain, were supported by practical experience in other nations.

In proportion as the system of improvement, undertaken by the Pharmaceutical Society, was developed, the theories of its founders assumed a substantial form, the operations of the Society furnished evidence of its practical utility in raising the qualifications of the body, and the sanguine hope of ultimate success was the reward of past labour and a stimulus to future assiduity.

Within two years of the establishment of the Society, the Pharmaceutical Chemists, who had previously been scattered and disunited, became an influential body—the general impression that they were unfit to be entrusted with corporate powers gave place to an opposite opinion—and a royal charter was obtained. From that time to the present (a period of eight years) the character of the Society has been gradually rising in scientific importance, and it now stands even higher in the estimation of the profession and the public in this country and abroad, than it does in the minds of some of its own Members. There is but one great deficiency which remains to be supplied, namely, an Act of Parliament; and this deficiency has been a source of discouragement to many who anticipated a more speedy consummation of their wishes.

If the delay in the accomplishment of the legislative part of the undertaking had been occasioned by internal defects in the machinery constructed as its basis, we should have participated in this discouragement. But it may be attributed to an entirely different and extraneous obstacle, one over which we have had no controul, and which cannot long continue to operate in the face of the mass of evidence the records of the Society afford in support of its claims. The obstacle to which we allude is the supposed connexion of Pharmaceutical with Medical Reform, and the erroneous idea that the recognition of Pharmacy by the legislature must be preceded by a settlement of the differences between the medical bodies.

It is now, we believe, generally admitted that the entire question (embracing Medicine, Surgery, and Pharmacy) is of too complicated a nature, and involves too many incompatible prejudices, to admit of amicable adjustment by any one scheme that human ingenuity can contrive. The object might be attained by a division of the labour, by introducing reform "in divided doses;" but the attempt to combine the whole into one gigantic "bolus," may be compared to the futile project of building the tower of Babel.

It has also been proved beyond the possibility of contradiction, that the portion of the scheme which relates to the pharmaceutical department is neither complicated, nor likely to provoke opposition. It will not curtail in any way the privileges and powers of medical practitioners—it will not create a monopoly to the injury of the public. On the contrary, the measure is calculated to advance medical science by ensuring greater skill and accuracy in the preparation of medicines, and to benefit the public by placing the sale and manipulation of drugs, including poisons, in the hands of regularly educated and competent persons.

The Pharmaceutical Chemists themselves have paved the way for this beneficial reformation, they have appealed to the legislature for assistance in completing the task, and some of them are discouraged at the coolness with which their labours for the past nine years have been treated. They are unable to comprehend the policy, or appreciate the consistency, of the Minister, who proposes to bring in a bill for regulating the sale of a few poisons as a means of protecting the public health, and neglects to avail himself of the opportunity of regulating by law the qualifications of those who deal in poisons of every description. If this opportunity should be lost—if the zeal of the Chemists should relax for want of support in their praiseworthy undertaking—a great and heavy responsibility would rest on the Government. We have, however, grounds for believing that this will not be the case, and that perseverance on the part of the Society will overcome all obstacles. The discussion on the sale of poisons has had a good effect. It has led irresistibly to the consideration of the subject of Pharmacy, and this has produced a conviction that the two questions, *Pharmacy* and *Poisons*, are far more intimately connected than *Medical* and *Pharmaceutical* reform. This is a step in advance, and we trust it will lead to a favourable result.

It has always been our desire to avoid, as much as possible, interfering with those branches of medical reform which do not concern our body: but it has been impossible to abstain altogether, for the reasons above stated, and we have therefore occasionally thrown out suggestions calculated to promote or facilitate an arrangement of the entire question, this result having been officially stated to be the only means by which an arrangement of the pharmaceutical branch of it could be brought about.

In future we shall endeavour to confine our observations within a more narrow compass, in the conviction that the speedy accomplishment of the object in view now depends, not on the passing of a medical bill, but on the steady determination of our own body to press forward harmoniously in claiming their just rights at the hands of the legislature.

THE BILL FOR REGULATING THE SALE OF POISONS.

Some progress has been made in the preparation of the Bill, of which the Secretary of State gave notice in the House of Commons, for regulating the Sale of Poisons. We understand that the proposed Bill is founded on the resolutions agreed to by the Committees of the Provincial Medical and Surgical Association and the Pharmaceutical Society. It has been also in contemplation to add other provisions to make the measure more effectual. Some practical difficulties, however, have been found to require further consideration, and in the mean time, the session (which, like time and tide, will wait for no man) is rapidly advancing towards a close. The pressure of business which always occurs at this period of the year, has interfered with the completion of the Bill, which we have reason to believe will not be brought in until next session.

We have received an assurance that as soon as the Bill is prepared, the Council of the Pharmaceutical Society will have an opportunity of considering it, before the details are finally adopted for presentation to Parliament.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES
(Continued.)

ELECTED IN MAY, JUNE, AND JULY.

MEMBERS.

ALNWICK	Dores, James	39, Bondgate Street
ALRESFORD	Moody, Henry	East Street
BIRKENHEAD	Barker, William R.	Grange Lane
BRIGHTON	Tabrum, James A.	79, Western Road
CHELMSFORD	*Baker, Charles P.	High Street
DERBY	Goodall, Henry	5, St. Peter's
HAMMERSMITH	Watkins, Thomas W.	King Street
ILMINSTER	Hagley, William Thos.	Silver Street
KESWICK	Longstaff, John	Museum Square
LEEDS	Ringrose, Blanshard	Hunslet Lane
LINCOLN	Edwards, Henry	320, High Street
LONDON	Bird, Augustus	22, High Street, Kensington
	Matthews, Edward S.	111, Guildford Street
MANCHESTER	Carter, William	Cheetham Hill
	Jones, Robert	
MAURITIUS	Fleurot, Louis Emile	Port Louis
	Lamusse, Adolphe	Port Louis
NEWTON ABBOTT	Parsons, John Henry	2, Courtenay Street
OXFORD	West, Isaac	69, St. Giles's Street
PORTSMOUTH	Parsons, William	St. Mary's Street
RICHMOND	Thompson, Thomas	Market Place
ROCHESTER	Buck, George	
WATERLOO	Jones, William	
WOLVERHAMPTON	Wootton, William	Market Place
YORK	Hepton, William	Lower Ousegate

MAJOR EXAMINATIONS.

Alexander, William	Peckham
Caley, Albert	Maidstone
Corder, Octavius	Exeter
Field, James John	Brighton
Gale, Samuel	Bedford
Goode, Charles	Congleton
Johnson, William G.	Jersey
Kershaw, George	Diss
Lamusse, Adolphe	Mauritius
Lever, William	London
Russell, Charles J. L.	Maidstone
Sims, John F.	Southton
Urwick, William W.	Belfast
Watkins, Thomas W.	Dudley

MINOR EXAMINATIONS.

Boyce, John P.	Chertsey
Corder, Octavius	Exeter
Field, James John	Brighton
Fyfe, John Lawrence	"
Mailloux, Auguste	Mauritius
Stocken, James	London
Urwick, William W.	Belfast

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Baxter, George	Mr. Davies	Chester
Breton, Walter	Mr. Evenden	Margate
Clarke, Fielding	Mr. Shepperley	Nottingham
Hackett, Thomas	Mr. Millns	Spalding
Hardy, Joseph	Messrs. Southall	Birmingham
Harpley, Richard B.	Mr. Hodgson	Stockton
Hinde, Robert	Mr. Wilson	Lancaster
Hyde, Henry V.	Mr. Bilton	Birmingham
Jenvey, John H.	Mr. Kendall	Stratford-on-Avon
Jones, Humphrey	Mr. Higgins	Birkenhead
Johnson, George	Messrs. Southall	Birmingham
Kingston, William	Mr. Asling	Spalding
Lakeman, Nicholas	Mr. G. Mennie	Plymouth
Meadows, Robert W.	Mr. Harsant	Gosport
Richmond, Robert	Mr. Collier	York
Sharland, William H.	Mr. Smith	Barnet
Shepperley, George	Mr. Shepperley	Nottingham
Tory, Albert	Mr. Beedell	Tiverton
Treatt, Henry J.	Mr. Knott	Exeter
Wells, Edwin	Mr. Grounds	Ludlow
Willcox, John	Mr. Hollier	Dudley
Wilstrop, William R.	Mr. Seaton	Hull
Woods, Edwards	Mr. Corbyn	Beccles

LIVERPOOL CHEMISTS' ASSOCIATION.

ROYAL INSTITUTION.

A COUNCIL meeting was held on the 4th July, and the following officers elected for the ensuing year :—

MR. ROBERT CLAY. ....President.
MR. C. W. SHAW ....Vice-President.
MR. E. EVANS..................Treasurer.
MR. J. B. EDWARDS } ......Secretaries.
MR. F. JARDINE ... }

A Pharmaceutical meeting was held on the 12th, Mr. ABRAHAM in the chair, when Dr. NEVINS delivered a very interesting lecture on the atmosphere, in which he entered into calculations proving the amount of carbon in the air to be equal to the supply of the whole of the vegetable kingdom, and therefore the only probable source of this element was the carbonic acid thus inhaled. The subject was illustrated by many beautiful experiments in pneumatics, and much interesting matter was introduced.

Mr. W. JOHNSON then read a paper on Malaria, Miasm, &c., in which he detailed the various theories on this mysterious subject. That to a certain extent the decay of organic matter might cause or assist in the spread of disease was granted, but instances were given in which no such agency could be traced, indeed it appeared that many cases of fever could be accounted for by the simple fact of an atmosphere overcharged with aqueous vapour, being unable to remove the moisture thrown off by the skin, and thus by checking evaporation from the body, inflammatory action is induced, and a state of fever soon follows. This was illustrated by a case narrated by Lieut. Hoskins, when fever was breaking out on board ship, with a temperature of 108° F. and a damp atmosphere, by raising the temperature to 130° F. in the cabins, the air was rendered capable of containing more moisture, the action of the skin restored, and fever completely stayed, while other ships in the same fleet suffered great loss.

Good drainage, plenty of water, and the sun's rays freely admitted into dwellings, appear to be most beneficial in checking and preventing these dreaded calamities, as the comparative freedom from their ravages of late years has shown, and many interesting facts and cases were adduced by the author.

Mr. **Abraham** stated that since his remarks in the last number of the Journal on Scotch chloroform, he had received other samples in exchange, one of these still appeared good; another was equally so at first but, after the lapse of thirty-six hours, it appeared to have undergone decomposition, and both reddened and bleached litmus paper. One sample of chloroform he had treated with milk of lime, and separated one portion by decantation, and a second by distillation. On examination both appeared equally pure, but after standing a few days the distilled portion reddened and bleached litmus paper, while the decanted chloroform has undergone no change.

Mr. **Edwards** stated that he had examined two samples of Scotch chloroform obtained from other sources than Mr. Abraham's, and he found both to contain free hydrochloric acid.

On the evenings of the 15th, 17th, 19th, 22d, 24th, and 26th, Mr. Edwards delivered a course of lectures on the "Pharmacopœias," reviewing the processes for inorganic preparations given therein, and also those in commercial use.

REPORT AND ANALYSIS OF AN INTERESTING SPRING, AT THE ORRELL COLLIERY, WIGAN.

BY DR. SHERIDAN MUSPRATT, F.R.S.E.

Mr. **James Brancker** was good enough to submit to me for my report and analysis a water from the coal mines of W. H. Brancker and Co., at Orrell, near Wigan. Washerwomen were noticed flocking to this spring, therefore, it was supposed to contain a large amount of soda, which supposition is verified by analysis.

Represented in the imperial gallon.

Total amount of residue .... 44.00 grains

Consisting of the undermentioned constituents in the proportions given, *viz.*

Organic matter and Silica	2.04 grains
Chloride of Sodium	9.94 "
Sesquioxide of Iron Sulphate of Soda	a trace
Carbonate of Calcia	5.17 grains
Carbonate of Magnesia	2.99 "
Carbonate of Soda, &c.	23.86 "

The water is well adapted for domestic purposes; and its small amount of carbonates of calcia and magnesia, and the presence of so large a quantity of carbonate of soda, render it most valuable for all purposes where soft water is required. For boilers it is most suitable, producing only a slight incrustation. I should think the water excellent in cases of dyspepsia, gout, or acidity of the stomach. When the water is boiled for some time and allowed to cool, all the carbonates of calcia and magnesia deposit, so that the supernatant liquor holds only soda salts in solution, *which fit it admirably for washing pur-*

poses. It would not be remunerative to attempt to get the carbonate of soda from the water, as it has only about twelve ounces per ton; but this, compared with the amount other waters yield, *is a considerable quantity.*

I deem this water extremely interesting in a scientific point of view. Many of the Liverpool waters contain carbonate of soda; but its quantity in the Green Lane, Bootle and Windsor waters, does not exceed one grain and a half per imperial gallon.

ORIGINAL AND EXTRACTED ARTICLES.

THE CONTAMINATION OF DRINKING WATER WITH LEAD.

Last month we noticed very briefly the danger which might arise from the employment of *pure* water for domestic purposes, when conveyed through lead pipes, or contained in cisterns of the same metal. The Board of Health disregard this contingency for several reasons. In order to produce the action on lead, both air and water are necessary; and as one part of the proposed plan consists in substituting the continuous for the intermittent supply, the pipes would be always full, and consequently not subjected to the alternate action of air and water. It is also proposed to abolish cisterns and to substitute iron and earthenware for lead pipes. We have already given our opinion respecting cisterns and the continuous supply, which opinion is opposed to that of the Board of Health for reasons before stated. The abolition of lead in all utensils for containing or conveying water is a scheme so problematical and speculative that it would be unsafe to found any general plan upon the assumption that this revolution is about to take place. But the report further states, that the danger arising from the contamination of water with lead has been greatly exaggerated, that in most of the cases where prejudicial results have occurred, these may be accounted for by some carelessness or other accidental circumstance, such as the presence of other metals causing galvanic action, or of atmospheric air, or impurities favourable to the corrosion of lead, &c., which casualties we are told may be avoided by the precautions suggested.

We cannot admit as conclusive the data upon which these views are founded, although the subject is one which ought to be seriously considered and more minutely investigated.

In the mean time we know by the experiments and facts already published, that the solubility of lead in water is greatly retarded or prevented by the presence of a certain amount of salts in solution; and it would be prudent to submit to this inconvenience until it can be proved beyond a doubt that the lesser evil can be obviated without the danger of incurring the greater.

The editor of the *Medical Gazette* confirms this opinion in his article on the

PROPERTIES OF THE WATER OBTAINED FROM WENHAM LAKE AND NORWEGIAN ICE.

"In confirmation of the observations of Mr. Faraday, on the purity of water obtained from Wenham Lake and Norwegian ice, a specimen was lately submitted to examination, with the following results :—The water was colourless, tasteless, and vapid; it was free from acid and alkaline reaction; was not affected or rendered turbid by nitrate of baryta, oxalate of ammonia, nitrate of silver, ammonia with phosphate of ammonia, or lime water. It gave only a slight opacity after some minutes with acetate of lead, but this was no greater than the effect produced by the same reagent on distilled water.

"Tried with the soap test, it marked 0° of hardness; and when a sheet of polished lead was plunged into it, a white deposit of hydrated oxide and carbonate of lead was formed in an hour. These facts show that the water derived from pure ice is absolutely pure, and may be used in remote places as a substitute for distilled water when this cannot be readily procured. This suggestion may be of use to those who have hitherto found a difficulty in procuring an abundant supply of distilled water for the purposes of chemical research.

"The rapid action on lead is in conformity to general experience, and is a strong indication of the great purity of ice-water. The fact that white lead is so abundantly produced by the contact of this metal with ice-water may be of some importance in relation to health, since it would render it unsafe to employ refrigerators lined with lead for the purpose of preserving the Wenham Lake or Norwegian ice.

"It should be observed that the water here experimented on was derived from ice absolutely transparent and pure, without air-bubbles. Some kinds, when melted, produce a kind of water which has a slight opacity, obviously from the presence of impurity."—*Medical Gazette*, July 19, p. 130.

The following account of the

CASES OF POISONING BY LEAD AT CLAREMONT,

is extracted from a letter by Dr. H. Gueneau de Mussy, published, in the Dublin Quarterly Journal of Medical Science[†]. The entire letter is highly interesting, but we omit those portions which describe the minutiæ of the symptoms and medical treatment, quoting merely a brief statement of the facts, with the observations relating to the Chemistry of the subject.

"I was summoned to Claremont in the beginning of October, 1848; and on my arrival was immediately shown into the room of one of the members of the family, who had been residing there since the preceding March. I found him lying down, with an anxious countenance, the conjunctiva of a yellowish colour, and the flesh flabby, evidently proving a loss of substance. He told me he had been suffering for several days from violent colic, which had been relieved, after a constipation of two days, by abundant alvine evacuations, produced by a purgative draught.

"This was the third attack of the same nature during the space of five weeks. Some time before, towards the end of July, he had been suffering from colic, with nausea, frequent eructations, and irregularity of bowels.

* * * *

"I learned that a brother of my patient had experienced the same symptoms; but no one was astonished at it; as it was supposed he was suffering under a liver complaint contracted on the western coast of Africa.

* * * *

"A third patient, of forty-eight years of age, who was also subject to constipation, had violent colic a few days before, attended with nausea, and even vomiting. * * * *

"A few days elapsed, and no bad symptoms disturbed our security.

[†] Vol. vii., page 405.

My patients had resumed their usual occupations, had good appetites and pretty fair digestion, but were still very weak, and pale sallow complexions had replaced the icteric colour. My delusions did not last long. About ten days after, a new access of symptoms began, with a painful sensation of constriction about the epigastric region, anxiety, nausea, and eructations."

After describing the symptoms and the treatment resorted to before the real cause of the disorder was suspected, the doctor mentions the circumstances which led to the discovery which induced him to adminster sulphur in combination with iron internally, and to order sulphurous and soapy baths. He proceeds—

"The chemical action showed itself almost immediately by the black discolouration of the nails of the feet and hands, and by the appearance of similar spots on different parts of the skin. One of the patients came out from the second bath with the abdomen entirely black. The soapy frictions and baths usually washed away the spots from the skin, but not those of the nails. The appearance of this reaction,—which is very common with men working in lead manufactures when using sulphurous baths,—is explained by the combination of the sulphur with the saturnine molecules adhering to the skin. In these cases it was evident that the lead was brought to the surface of the body by means either of the sudaminal or follicular exhalation, and perhaps by both. The metal is eliminated and transformed into sulphuret of lead by the sulphurous baths, and then taken off by the soapy frictions and baths. These were not useless, for without them the lead deposited on the surface might have been carried again, by absorption, into the economy.

"But the skin was not the only means of giving exit to the poison, I discovered it in the urine, by a solution of hydrosulphate of ammonia.

"Some physicians and chemists look on sulphur as the only efficacious remedy; others, on the contrary, assert that it is without any effect. What I can tell you is, that the success was beyond my hopes. After two or three weeks, I had the satisfaction of seeing my patients progressing rapidly and surely towards recovery. This happy result induced me to try the same means with another person, older, and of a weaker constitution, and consequently, for whom I was most uneasy, and the results were as satisfactory. * * * *

"One of my patients was accustomed to drink Vichy water at table. This was a very unfortunate predisposing circumstance; it is probable that the salt of Vichy water, *i.e.*, bicarbonate of soda, united to the lead of Claremont water, had much to do with the violence of the attack under which he suffered.

"At the time of my arrival at Claremont, there were thirty-eight inhabitants. Thirteen of these have been attacked, eleven men and two women. Four of them had some symptoms two months previously to my arrival, the other cases occurred under my own eyes. Some, even after the pipes had been cut off were affected, and one when on the continent, a week after leaving England. Six children in the household, aged from three to seven years, have been exempt from it. Only half of the patients have had the gums marked with the slate-coloured line, and spots of the same colour on the mucous membrane of the mouth; and these spots, and the blueish line of the gums, were observed on several others who did not experience or exhibit anything else; and those signs of the poison having been taken into the economy have not yet disappeared. The morbid cause has acted in these cases, as it often does, with caprice, and according to individual dispositions which defy every reasoning. The malady has shown no respect for condition, and attacked indiscriminately servants, aides-de-camp, and princes. * * * *

"The spring that furnishes the palace of Claremont with water, issues from a sand-bed at about two miles distance. It was chosen for its uncommon purity from among a great many others in its vicinity, and the water was, thirty years ago, conducted to the palace through leaden pipes. In the present day, some other metal would, perhaps, have been selected, for experience has taught us that pure water, and especially distilled water, acts rapidly on lead when it comes in contact with it.

"Thus Tronchin proved that the inhabitants of Amsterdam were indebted to the rain water, kept in leaden cisterns, for the colic they were so much subject to in his time. The purity of the Claremont water becomes a most dangerous property, and not only to it but to other springs. Whilst I was combating its pernicious effects, I heard that there had been several similar cases in different parts of England; they are not uncommon in the county of Surrey, and especially in the neighbourhood of Claremont. Besides the cases published by Dr. Thompson, I know of several others at Weybridge, Windsor, and in different other places.

"The water of the palace of Claremont had been for many years employed by its inhabitants without any bad result; how was it then that this water, till now harmless, had become suddenly a violent poison? This is what has puzzled me and everybody else; and although I looked for its cause with the greatest attention, I could discover only a single alteration, apparently of little importance, lately made in the transmission of the water.

"Until about eleven months ago, leaden pipes used to take up the water from a large natural cistern near its source. When the present occupants of the palace came to live in it, they wished to preserve this natural cistern from the vegetable and animal detritus that usually fell in it. For this purpose an iron cylinder of six feet in diameter and twenty feet high was constructed, and was sunk into the ground fifteen feet deep. The water swelled up within, and a leaden pipe was attached to it, with a funnel-like mouth projecting by a few inches in the inside of the cylinder, which was closed at top by an iron cover with several holes in it to allow the air to make the requisite pressure on the surface of the water. You may discover what has been the influence of this change; for myself I think it has been the origin of all the evil. The datum is certain, but I have only hypothesis to offer as to the chemical reaction of the water. Mr. R. Phillips, so well known for the accuracy of his researches, has, however, analysed the water of the spring, and has only found in a gallon of it 5.7 grains of solid and saline matter, consisting of

	Grains.
Common salt	2.7
Sulphate of lime, silica, oxide of iron, and vegetable matter	3.0
	5.7

That is to say, a proportion of salts, and especially of sulphates, too small to prevent the formation of hydro-carbonate of lead, for experiments have proved that $\frac{1}{4000}$ of sulphate is necessary to prevent the development of the deleterious salts.

"As for the part acted in this case by the iron cylinder, I must look for it, first,—in the galvanic action resulting from the contact of the two metals with the water. I have, however, some hesitation in admitting this supposition, for it seems to me that the water contained in the cylinder should be charged with more lead than that which ran through the pipes, and remained for some time in the leaden cistern of the palace; and yet the water of the iron cylinder did not contain any lead: that of the pipes contained some, and that of the cistern contained much more of it.—Secondly, in the action of the iron on the water, and on the salts which it contained; and, thirdly, in the very purification of the water, caused by the enclosure of it in the iron cylinder, and the filtration which it underwent to get into it. We may understand this better at some future day.

"For the present I hope I have said enough to impress upon my readers the danger of using water that has been in contact with lead, a danger *increased in proportion to its purity;* and to point out the bad effects that are likely to arise from transmitting water alternately through lead and iron conduits. * * *

"I should inform you that Professor Hoffman has ascertained the quantity of metallic lead contained in the water examined by him. He has found that it amounted to a grain per gallon, an enormous quantity, when we consider that the poisoned water was used in all culinary and table purposes, and previously to the discovery of its deleterious character, even in the preparation of tisans and lavements."

LENTILS—REVALENTA—ERVALENTA.

In the year 1845 (vol. iv., p. 415) we exposed the nature of the "Ervalenta and Melasse de Cochinchine," sold as remedies for constipation by Mr. Wharton, who was tried before the Cour Royale de Paris for the sale of secret remedies. The ervalenta was found to be the meal of the common lentil (*Ervum lens*); and the melasse, common treacle (molasses). In 1848 (vol. viii., p. 30), we noticed the "Revalenta Arabica," described by the vendor as "a nutritive and eminently curative fecula, derived from an African plant." This also proved, on examination with the microscope, to be lentil meal. When the fact became known, a fresh impulse was given to the sale of lentil meal by the puffs which had been circulated in its favour under its new and imposing names. Several Chemists and others, throwing off the disguise, offered to the public the old fashioned commodity on its own merits, and at a reasonable price. But it appears, that in anticipation of the possible discovery of the secret, a precaution had been taken, which is the most ludicrous part of the farce:—

In the year 1843, Alfred Hooper Nevill, one of the vendors of lentil meal *in disguise* took out a patent, assuming to be for "improvements in preparing lentils and other matters for food," and the vendors of lentil meal, *in propriâ personâ,* are now threatened with legal process for an alleged infringement of the patent!

Being unable to imagine any just grounds on which such a patent could be obtained, we have procured a copy of the specification, which is subjoined:—

"My invention relates, first, to preparing lentils, by splitting them and separating the husk therefrom, whereby lentils are rendered fit for food for those purposes where split-peas are now used.

"And, secondly, my invention relates to manufacturing flour from lentils, which may be used in soups and other food, and, when desired to heighten the flavour, such flour is combined with a small quantity of curry powder, which combined preparation will be found very useful in the making of puddings and other preparations of food. And in order that the invention may be fully understood, I will explain the means pursued by me. I first wash and then dry the lentils; I then split them with stones in like manner to that practised when splitting peas;—and I would state, that I do not claim the simple act of splitting lentils, as that has heretofore been practised when preparing food for horses. The first part of my invention, consisting of separating the lentils from husks, and thus rendering the same fit for making puddings and other food for man; and I cause the husks to be separated by means of winnowing or other suitable machines, and it is the separated product which constitutes the first novelty of my invention; and when it is intended to make flour therefrom, I cause the same to be ground into flour by suitable stones or other grinding machinery; and when curry powder is to be mixed therewith, I apply and intimately mix about one ounce with about four pounds of the flour of lentils, which will be found to improve the flavour of the lentils.

"Having thus described the nature of my invention, I would wish it to be understood, that what I claim is, first, the manufacture of a product of lentils separated from the husk, and thus rendered suitable for food for man.

"And, secondly, I claim the manufacture of flour of lentils separated from the husk thereof, which will be found a valuable material for the making of puddings, soups, and other articles of food for man. And I also claim the combining with such flour of lentils a small quantity of curry powder.

"In witness whereof, I the said Alfred Hooper Nevill have hereunto set my hand and seal this 23d day of September, in the year of our Lord 1843.

"ALFRED HOOPER NEVILL."

Novelty being the fundamental requisite in every patent, this specification either contains something new, or it is a nonentity. Does the novelty consist in reducing lentils to a state "fit for making puddings and other food for man?" We are told in Genesis (ch. xxv., v. 34) that "Jacob gave Esau bread and pottage of lentils." Without any patent process, this pottage was so unexceptionable, that for one mess of it, Esau sold his birthright. Lentils are mentioned as articles of diet by Xenophon and other ancient writers, and also in old Encyclopædias. It is stated that they are used as fodder for cattle, and "for making admirable pea-soup." They are used as ordinary diet in Arabia and other countries, where the name of Nevill is unknown.

There is therefore no novelty in the preparation of lentils for human food, neither is there any novelty in the mode of preparation described by the patentee, for this is done, first, by splitting (for which no claim is made); secondly, "by means of winnowing or other suitable machines," which separate the chaff; thirdly, by grinding into flour "by suitable stones or other grinding machinery." These are the processes adopted by every miller for reducing grain into flour. The only remaining invention (?) is, that of intimately mixing an ounce of curry powder with about four pounds of meal, to improve the flavour. The flavour will of course depend on the ingredients used in making the curry powder, on which no instructions are given.

A specification so entirely destitute of novelty or invention is quite a curiosity. Any person who reads it must be convinced that the patent is available only for the purpose of advertisement.

The manner in which this advertising is carried on demands exposure. We have before us a printed bill (dated July, 1850) recommending "The Revalenta Arabica, discovered, exclusively grown, and imported by Du Barry & Co., sole owners of the Revalenta estates, and of the patent machine by which ALONE the curative principles of the plant can be developed." This contains an IMPORTANT

CAUTION against the "deception which has been tried by FIFTY DIF- "FERENT GANGS OF SWINDLERS, who, too lazy to work honestly for "their living, try to levy contributions on the credulous or super- "ficial, by offering them trashy compounds of peas, beans, lentils, "Indian (corn?) and oatmeal, worth about *one penny* per lb., under "some imitation of the name of 'Du Barry's inimitable Revalenta "Arabica.'" "Messrs. Du Barry and Co. have taken the trouble to "analyze these miserable imitations, and found them excellently "adapted for PIGS, being respectively heavy, irritating, and heating, "they would play sad havoc with the delicate stomach of an invalid "or infant." The Revalenta is sold in pound canisters at 2*s*. 9*d*., super-refined quality, ten pounds, 33*s*.

"Nevill's Patent Flour of Lentils" is sold with the Royal Arms, in packets at 6*d*. and 1*s*.; or six-pound canister, 5*s*. 6*d*., with the caution, "Be not deceived by fine names and exorbitant charges."

A correspondent has forwarded to us an original letter, which he received last May from Nevill and Co., stating, "We are not a buyer of lentils at the price you name. We have between forty and fifty tons by us, and should be pleased to sell some at 2*d*. per lb., delivered in Manchester."

The question naturally arises, Does Du Barry include Nevill and Co. among the "gangs of swindlers?" Du Barry has purchased of Nevill a licence under his patent. We may conclude, therefore, that the interests are consolidated, while the semblance of hostility is preserved. Probably it may be explained in this way:—*A*. puffs a well-known article of food into notoriety under a new name, describing it as the produce of a plant "resembling our English honeysuckle;" *B*. discovers what it is, and takes out a patent for it under its real name. If *A*. were to upset the patent he would expose himself; a compromise is therefore agreed upon. *A*. continues to bait his hook with the article under a fine name at 2*s*. 9*d*. *B*. uses the Royal Arms as his bait, and charges 1*s*. If an honest tradesman presume to sell the article without disguise or deception at the market price, *A*. denounces him as a "swindler," and *B*. pounces upon him with a legal process for infringing the patent! *B*. would be pleased to sell a portion of his stock at 2*d*. per lb., but denies to the purchaser the right of grinding it, and reducing it to a state "fit for "the food of man." *A*. maintains that it is only fit for pigs (unless sold under a fine name, which raises the price from 1*d*. to 2*s*. 9*d*.)

We have not pointed out who are the "swindlers" alluded to by Mr. Du Barry. This being a delicate question, we leave our readers to make the discovery.

PILULÆ SODÆ ARSENIATIS COMPOSITÆ AND UNGUENTUM SULPHURIS HYPOCHLORIDI COMPOSITUM.

BY ERASMUS WILSON, ESQ., F.R.S.

WILL you oblige me by giving the following formulæ a place in the Pharmaceutical Journal. They relate to remedies which I am in the habit of prescribing frequently, and for the sake of economy of time I have abbreviated them in some instances when I knew that the prescription would be dispensed by Chemists acquainted with the formulæ; but have had to regret on more than one occasion, when the prescription has fallen into other hands, that the formula was not detailed. This inconvenience will, I hope, be obviated by your permitting me to publish them in your Journal.

PILULÆ SODÆ ARSENIATIS COMPOSITÆ.

℞ Sodæ arseniatis, gr. ij., solve in aquæ distillatæ, q. s.
Pulv. guaici, ʒss.
Pulv. antim. oxysulphureti, ℈j.
Mucilaginis acaciæ, q. s. Misce bene ut ft. pil. xxiv.

UNGUENTUM SULPHURIS HYPOCHLORIDI COMPOSITUM.

℞ Sulphuris hypochloridi, ʒij.
Potassæ subcarbonatis, gr. x.
Adipis purificati, ℥j.
Ol. Amygd. essent., ♏x. M. ft. unguentum.

For another of my formulæ, the *Unguentum stimulans*, I must refer your readers to the Pharmaceutical Journal for November, 1848, page 246.

17, *Henrietta Street, Cavendish Square,*
July, 1850.

THE ADULTERATION OF ISINGLASS.

Messrs. Dawson and Morris have adopted a method of clearing themselves of the charge of adulteration, which is no less ingenious than the adulteration itself.

In the month of June they issued a circular, introducing the report of Messrs. Phillips and Cooper, with the following preface :—

> "In reference to the late charges made against our house, for the satisfaction of our friends, we have placed ourselves in the hands of Messrs. Cox, Heisch, and Co., who have themselves obtained samples of isinglass furnished by us to wholesale houses in the course of business, and had them chemically tested by Professors Phillips and Cooper, and we have now the pleasure to hand you the result, as published in the Pharmaceutical Journal of this month, which you will perceive clears our character from the charge of adulteration."

Having quoted the report from the Pharmaceutical Journal, but *omitting the comments upon it*, they proceed :—

> "We trust that this statement, coupled with the fact of our business having been established for upwards of seventy-five years, which our Mrs. Dawson has herself now carried on for nearly twenty-five years of that time, will be a sufficient refutation of the charges made to our prejudice, and which, although generally disbelieved, we cannot pass unnoticed. We will only further state, in regard to the assertion 'that we do not import ourselves,' that our purchases are made through the first houses in St. Petersburgh, and that on reference to the Customs' Bills of Entry you will find a confirmation of the fact.
>
> "No exertion shall be wanting on our part to secure a continuance of the favours that we have so generally and so long received, and to supply a genuine article at the lowest price.
>
> "We remain, Sir, your most obedient servants,
> "Dawson and Morris."

Thus they seek to establish their innocence, first on a report, the inaccuracy of which has been fully exposed; and, secondly, on the antiquity of their house! Lastly, we find "our Mrs. Dawson" thrust forward in the van, the gallantry of the British public being resorted to for safety, in the same manner as an escaped convict takes refuge in a church. We should be sorry to cast reflections on the character of a lady, and congratulate the firm on this part of their defence.

The observations in our former numbers, respecting Messrs. Swinborne's gelatine, have occasioned some uneasiness in the minds of those gentlemen, who fear that the mention of their names in connexion with a fraud, might possibly lead to a suspicion that they are in some degree implicated. We consider this fear imaginary; at the same time we cannot in justice refuse to publish the following extract from their letter:—

"TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

"SIR,—We have only recently discovered that our name and manufactures have been introduced into the discussion of a subject under the above head, inserted in the June and July numbers of your Journal: this having taken place without our sanction or knowledge, we trust you will consider us entitled to offer a few observations on the subject.

"It will be in your recollection that our articles were first introduced into this discussion by Professors Phillips and Cooper, at the instance of Messrs. Dawson and Morris (who are largely engaged in the isinglass trade) with a view to disprove certain experiments and results given by Professor Redwood, and published in the May number of your Journal.

"It appears by your statement that our gelatine was not alluded to in any way as having been used by the persons charged with the adulteration, and it is therefore unnecessary for us to do more than confirm this. We are manufacturers (under letters patent) of a pure article, and are deeply interested in the exposure of any fraud or adulteration of articles which enter so largely into the domestic consumption in this country.

"You state in your number for June that the subject, as regards *our gelatine*, requires further investigation, and this month you publish further experiments and observations of Professor Redwood thereon. Now, in any remarks we may think it necessary to make we do not complain of any observations previously inserted in your Journal; some inaccuracies capable of explanation have crept in, and we think it right to state that subject to these explanations, the experiments, so far as they have already gone, are satisfactory. What was the result arrived at by one of the oldest, and certainly not the least experienced, Professors of the day (Mr. Phillips), not employed by us, but set in motion by a competitor in the trade, assisted too by one of our first analytical Chemists (Mr. Cooper)? Why; that Swinborne's gelatine was superior to Belouga isinglass imported direct from St. Petersburgh—that it left less ash, was not acid to litmus paper, and was almost entirely soluble in water, and did not exhibit any flocculent insoluble matter peculiar to isinglass. True it is that Mr. Redwood's subsequent experiments in one particular (the amount of ash) do not coincide with the result given by Messrs. Phillips and Cooper; but what says Mr. Redwood? he states, "the kind of gelatine sold as 'Swinborne's patent refined Isinglass,' which is a highly-priced article, and in the preparation of which much care has obviously been taken, yields 1.8 grains of ash from 100 grains, while other kinds of gelatine yield as much as four per cent." Thus Mr. Redwood is of opinion, that as regards ash, our gelatine yields only one-fourth the quantity of other gelatines, and Mr. Redwood is silent as to the other advantages pointed out by Messrs. Phillips and Cooper. As to ours being a highly-priced article, we shall have an opportunity hereafter to satisfy Mr. Redwood that in this respect he is misinformed, we say without fear of contradiction, that our articles in comparison with others are the cheapest yet introduced; and as regards the amount of ash, we must observe that the articles upon which Mr. Redwood made his experiments were not supplied to him by us direct; the articles therefore may have been manufactured some considerable time, and in fact in one case we have reason to believe that the article had been in a competitor's warehouse for some time exposed to the dust. This may to some extent account for the discrepancy in the amount of ash discovered by the learned professors, yet we are inclined to attach some weight to the explanation given in this respect by Mr. Redwood, at any rate till further experiments have been made."

* * * *

"1, *Great Tower Street, July* 17, 1850."

The remaining portions of Messrs. Swinborne's letter are omitted, as they refer only to the relative qualities of different kinds of gelatine, which was foreign to the question at issue. It has not been our object to institute comparisons of this kind, but merely to expose a case of adulteration in which gelatine was used. The quantity of ash obtained from gelatine was not referred to as an indication of good or bad quality, but as a means of detecting the presence of gelatine in isinglass. We have no hesitation, however, in stating that Swinborne's gelatine is not surpassed by any we have met with.

ON THE MANUFACTURE OF PYROLIGNOUS ACID, PYROXYLIC SPIRIT, OR WOOD NAPHTHA, AND THE COMMERCIAL ACETATES OF LIME, SODA, AND LEAD, AND ACETIC ACID.

(*Continued from page* 35.)

There is a new method of carbonizing wood which must not be overlooked in our account of the manufacture of pyrolignous acid, although first designed and employed simply for the purpose of obtaining with greater certainty a charcoal suitable for the manufacture of sporting gunpowder. This charcoal is made of soft woods, such as alder, willow, &c., and the carbonization is not carried to so high a degree as is usually done in the manufacture of pyrolignous acid; the charcoal produced at this lower degree of temperature being not black, but of a purplish brown colour, corresponding to the *charbon roux* of the French. This charcoal is much esteemed by the gunpowder manufacturer, who cares nothing for the loss of the acid and other products of the distillation, so long as he obtains the kind of charcoal he wants; whilst, on the other hand, the manufacturer of pyrolignous acid is careful to submit the distillation of his wood to a high temperature, with the view of obtaining as much acid and pyroxylic spirit as possible, and at the same time also a perfect charcoal, of a raven black colour, which when used for fuel shall burn without emitting the least particle of smoke.

A careful consideration of this subject led M. Violette, the Director of the Government Powder Works, at Esquerdes, in France, to try the plan of carbonizing wood by means of steam heated to a high temperature. To effect this the steam in its passage from the boiler to the carbonizing cylinder is made to traverse a coil of metal pipe placed in the fire-place under the cylinder, whence it passes into the carbonizer. M. Violette found as the result of a series of experiments, that at a temperature of 200° C. = to 392° Fah. wood does not carbonize; that at 250° C. = to 482° Fah. an imperfect charcoal alone is obtained, called *brûlots* or burnt wood; that at 300° C. = to 572° Fah. the red charcoal is produced; and that at 350° C. = to 662 Fah. and above, the operation invariably furnishes the black or complete charcoal. The time necessary for carbonization he found to vary from three hours to half an hour; the charcoal passed from red to black progressively. He also took account of the produce of the charcoal, and found it to diminish in quantity in proportion as the carbonization was carried to a more advanced stage. The quantity of wood usually operated upon by M. Violette was 25 kilogrammes = to half a cwt., and the wood employed was the blackthorn (*Rhamnus frangula*).

The quantity of charcoal obtained, taking the mean of a great number of experiments, was about thirty-five per cent. of the *roux* or imperfect charcoal. In this process the super-heated steam on entering the cylinder and coming into contact with the wood, gives off the carbonizing heat with which it had become charged in its passage through the heated metal pipe, and escapes by the exit pipe, carrying off with it the liquid and gaseous products of the carbonization.

M. Violette has fully succeeded in regulating the temperature, so as to obtain charcoal of any kind that may be desired, by making use of the metals or alloys fusible at different temperatures. Two small hollow tubes of copper closed at one end, are adapted in such a manner as to penetrate by their closed end into the interior of the cylinder; each of these tubes contains a very small cylinder of tin; a small free iron needle surmounted by a light weight rests in the metal; as soon as this is melted the needle sinks, and in so doing indicates the temperature corresponding to the melting point of the metal. Four small similar tubes containing alloys of two or more metals, of which the melting points range from 250° to 400° C. = 482° to 752° Fah., afford a practicable and convenient method of taking the temperature. A somewhat similar method is adopted at the glass-houses in the North of England, and might be generally applied with great advantage in the manufacture of pyrolignous acid.

Hitherto we have spoken of wood in the state of billets, or as it is commonly called *cord wood*, and the refuse wood of the ship-builders, &c. We will now say a few words on the employment of sawdust, spent bark from the tanpits, &c., all of which, equally with cord wood, are capable of yielding by destructive distillation pyrolignous acid and its concomitant products. This, however, though practicable on the small scale, was found not to answer in a commercial point of view on a large scale, for the sawdust, in close contact with the heated cylinder, becoming carbonized, formed a layer of a perfect non-conducting material, and this, together with the minute division of the particles of the sawdust, presented an entirely perfect barrier to the passage of the heat to the interior of the mass. To effect the carbonization of these refuse materials two processes have been recommended; the one that of Mr. A. P. Halliday, of Manchester, whose process is as follows:—The raw material is introduced into a hopper, whence it is fed through a pipe by means of a screw, revolving in the said pipe to the retort, which has also a screw of about the same diameter as the inside of the retort; a revolving motion to which being given, the material is passed gradually, in an agitated state, through the heated retort. At the extreme end of the retort two pipes branch off, one passing downwards and dipping into a vessel or cistern of water into which the carbonized substance falls; the other pipe passes upwards, for the conveyance of the gases given off during the destructive distillation of the material, through a main conduit pipe to the condenser, which may be constructed according to any of the approved modes now in use.

The other process is that patented by Messrs. Solomons and Azulay, which consists in passing superheated steam into the mass, whereby the heating agent comes into actual contact with every particle of the vegetable mass and effectually carbonizes it. A charcoal well adapted for artificial manures is thus obtained, as well as the ordinary products of the distillation of wood, which pass off with the steam. It may be urged that the quantity of steam required for carbonization in passing off with the products of distillation, dilute them to such a degree as greatly to increase the quantity of fuel requisite for the evaporation of the acetate of lime or other acetate to be formed with it; this, however, is obviated by making the steam and heated vapours from the cylinder traverse a coil of pipe immersed in the solution to be evaporated, or pass through stills containing liquid to be distilled; all danger of the pipes being clogged up with tarry matter as in the exit pipes of ordinary cylinders, being prevented by the passing of the steam.

PART II.—*Separation of the Liquid Products of Distillation from each other.*—The condensed liquid products before described form by subsidence in the tank or receptacle two layers, the lower, composed of tarry and oily matters, and the upper containing the acid and spirituous parts of the products. If two tanks be provided, the one at a lower level than the other, the acid and spirituous liquor passes by means of an overflow-pipe into the lower tank, and thus become separated from the tar; and if the acid liquor in passing from one tank to the other be made to traverse a suitable filter, a large portion of the tarry and oily matters held mechanically in suspension by the acid liquor will be returned.

The next process depends upon the method of working adopted at each particular manufactory; but without individual reference we may class them all under two heads. First, those who distil the pyroxylic spirit direct from the crude acid liquors; and, secondly, those who first neutralize the acid liquors with lime and then distil off the spirit. The first class employ *copper* stills of a capacity of about 500 gallons; into these the crude acid liquor is pumped, and heat applied either by means of steam made to traverse a coil of well-connected copper pipes placed within the still, as at Pitchcombe Works, or the stills are heated externally as at Cwm Avon Works. In the second case sheet-iron stills or boilers are employed, and the previously neutralized acid liquor run into them, and external heat applied as at the Melancrythan and other works. In each case about 100 gallons, or one-fifth of the contents of the still, are distilled off and put by as containing all the pyroxylic spirit, the further distillation and purification of which we shall hereafter speak of. In the first case the remaining acid is next distilled off, and the residuary tarry liquor run off through a cock placed in the lower part of the still; or if distilled acid be not required, the remaining 400 gallons are run off into a suitable tank or reservoir, in which the tar settles to the bottom, and the acid liquor may be drawn off or pumped up for further use. In the second case the remaining 400 gallons of neutralized acid liquor, or acetate of lime solution, is run out of the still, and employed as will be hereafter described.

The tarry product of the distillation of wood is also distilled in copper or cast-iron stills, and the crude spirit obtained therefrom is added to that obtained from the distillation of the acid liquor above-mentioned.

PART III.—*Manufacture of Pyroxylic Spirit or Wood Naphtha.*—The crude and weak spirit procured in the distillation before mentioned, is next subjected to repeated distillations in order to obtain the spirit in a more concentrated form, which is then rectified by distillation, first with lime alone, and lastly with a mixture of lime and caustic potash. In some works chalk is employed, and in others lime and bicarbonate of soda. For this purpose copper stills are employed, and steam heat applied either through a coil of lead pipe placed within the stills, or to the outside of the still, the lower half of which has been previously cased in an iron jacket. The pyroxylic spirit thus obtained is perfectly colourless, and is to be met with in the market of specific gravity varying from 0.870 to 0.8320.

The quantity as well as quality of the pyroxylic spirit obtained at one works often differs much from that obtained at another works; the kind of wood employed has something to do with this, but management of the process much more. The quantity varies from 1¼ gallon to 2½ or even three gallons per ton of wood employed.

The following Table was constructed by Dr. Ure, with the view of showing the per centage of real spirit in pyroxylic spirit of different specific gravities. The wood spirit employed in the construction of this Table was purified by distillation over powdered quicklime, and was drawn over with the heat of a water-bath at such a temperature that its specific gravity was 0.8136 at a temperature of 60° Fahr.

Specific Gravity.	Real Spirit per Cent.	Over Excise Proof.	Specific Gravity.	Real Spirit per Cent.	Over or under proof.
.8136	100.00	...	.9032	68.50	13.10
.8216	98.00	64.10	.9060	67.56	11.40
.8256	96.11	61.10	.9070	66.66	9.30
.8320	94.34	58.00	.9116	65.00	7.10
.8384	92.22	55.50	.9154	63.30	4.20
.8418	90.90	52.50	.9184	61.73	2.10
.8470	89.30	49.70	...	...	underproof
.8514	87.72	47.40	.9218	60.24	0.60
.8564	86.20	44.60	.9242	58.82	2.50
.8596	84.75	42.20	.9266	57.73	4.00
.8642	83.33	39.90	.9296	56.18	7.00
.8674	82.00	37.10	.9344	53.70	11.00
.8712	80.64	35.00	.9386	51.54	15.30
.8742	79.36	32.70	.9414	50.00	17.80
.8784	78.13	30.00	.9448	47.62	20.80
.8820	77.00	27.90	.9484	46.00	25.10
.8842	75.76	26.00	.9518	43.48	28.80
.8876	74.63	24.30	.9540	41.66	31.90
.8918	73.53	22.20	.9564	40.00	34.20
.8930	72.46	20.60	.9584	38.46	35.60
.8950	71.43	18.30	.9600	37.11	38.10
.8984	70.42	16.60	.9620	35.71	40.60
.9008	69.44	15.30			

The following table is by M. Deville, with a view to show the per centage of real spirit in naphtha of different specific gravities at the temperature of 48° 5 Fahr.:—

Quantity of Water.	Specific Gravity.
00 per cent	0.8070
10 "	0.8371
20 "	0.8649
30 "	0.8873
40 "	0.9072
50 "	0.9232
60 "	0.9429
70 "	0.9576
80 "	0.9709
90 "	0.9751
95 "	0.9857

" If," says M. Deville, " these results are brought to a temperature of 60° Fahr., it will be found that there is an almost entire correspondence between alcohol and wood spirit, and that the latter equally with the former shows a maximum of contraction, which always takes place on the combination of one part of wood spirit with three of water, that is to say, in a mixture containing 45.75 per cent. of water. Dr. Ure has also constructed a table of the specific gravities of mixtures of wood spirit and water; but he has given 0.8136 as the specific gravity of anhydrous wood spirit, at a temperature of 60° Fahr." In an article on Pyroxylic Spirit and its compounds, which appeared in Thompson's *Records of Science*, vol. ii., page 374, it is stated, " the lowest specific gravity, to which, as far as we are aware, it has been brought in this country, is 0.812. Dumas, however, states that its density at the temperature of 68° is 0.798, and that of its vapour 1.120. Its boiling point, according to the same authority, is 151¾°, at a pressure of 30 inches. Mitscherlich gives 0.798 as its specific gravity, and 180° Fahr. as the boiling point. Mr. Scanlan, in the *Proceedings of the British Association*, 1835, gives .828 as the specific gravity, and 150° as the boiling point. " Wood spirit of 0.870 specific gravity," says Dr. Ure, " boils at 144° Fahr., and if it be brought by distillation to specific gravity 0.832, it boils at 140° Fahr." The commercial wood spirit varies very much both as to its specific gravity and its power of dissolving gum sandrac, shellac, &c., from its containing acetone, anesite, &c., in variable proportions. The presence of these bodies is to be accounted for by the variation in the modes employed for obtaining and purifying the wood spirit, as also by the more or less careful management of the several processes it is made to undergo. The question then naturally arises, how are we to judge of the quality of wood spirit ?—will a knowledge of its specific gravity, or of its boiling point, guide us in this respect ? If a wood spirit be required for burning in a spirit lamp, or for singeing horses, there can be no doubt but that the spirit of the lowest specific gravity is the best; but if the wood spirit be required for the manufacture of varnishes and polishes, especially those containing gum sandrac, then the above criterion will not apply. For instance, a sample of wood spirit containing 85 per cent. has been far preferred to that of another sample containing 95 per cent. We have invariably found that the wood spirit obtained by liming the crude liquor from the cylinders before distillation, does not dissolve sandrac, whilst that obtained by distilling off the spirituous portion of the crude liquor before liming, is a good solvent of sandrac, the spirit in the first case being of a low specific gravity, and miscible with water, whilst the latter contained less real spirit, and was rendered milky on the addition of water. At one works, upwards of two and three-quarter gallons per ton have been obtained on the average working of nearly 2000 tons of wood; whilst at another, a weekly consumption of 80 tons of wood has yielded only 160 gallons of pyroxylic spirit; and at a third, only 42 gallons have been obtained from 36 tons of wood.

(*To be continued*).

IMPROVED METHODS OF EXTRACTING TIN, LEAD, &c., FROM THEIR ORES.

In a patent granted to Mr. James Young, the patentee states the nature of his invention to consist:—1st, of certain methods or processes for obtaining tin and other products from the ores of that metal. Secondly, of an improved process or processes for obtaining lead from ores or slags of that metal, and a combination of lead and antimony from slags containing those metals.

The patentee proceeds to describe the preparation of the stannates of soda and potash from tin ore by means of the several processes hereinafter indicated. The first of these is, by means of the sulphurets of sodium and potassium, and, as these sulphurets are not ordinarily met with in commerce, the patentee gives the following directions for their manufacture:—Twenty-two parts of dry sulphate of soda are to be mixed with seven parts of small coal, and this mixture to be heated in a reverberatory furnace until no more inflammable gases are given off, the mixture being well stirred during the operation. When cool, the sulphuret of sodium thus formed is removed from the furnace, and dissolved in hot water, and all insoluble substances separated from the solution by filtration, or the clear liquor is decanted off, leaving the insoluble matters behind. The clear solution of sulphuret of sodium thus formed is then evaporated to dryness. Sulphuret of potassium is made the same way as sulphuret of sodium, by employing twenty-seven parts of dry sulphate of potash, and seven parts of coal. In order to convert the tin ore with the stannate of soda, by means of the sulphuret of sodium, the patentee directs that twenty parts of tin ore (black tin), of eighty to ninety per cent., be mixed with twelve parts of dry sulphuret of sodium, or an equivalent of moist sulphuret of sodium, and the mixture dried; but if dry sulphuret of sodium be employed, then six parts of water are to be added to the mixture of dry sulphuret and tin ore, and the mixture dried. This mixture is to be heated in a reverberatory furnace until the whole, or nearly the whole, of the tin ore is converted into a soluble stannate of tin. This may be ascertained by taking out of the furnace, from time to time, a sample of the mixture under operation, and putting it into water, by which means it will be readily ascertained whether any insoluble tin ore remains unacted upon. The patentee states, that he finds two hours usually suffice for the completion of this process. If stannate of potash be required, seventeen parts of sulphuret of potassium must be used for each twenty parts of tin ore employed, and the process followed as above described for the formation of stannate of soda. As the resulting stannate of soda and potash contains some free sulphur, the patentee proceeds to give directions for separating it, and replacing it by an equivalent of oxygen. For this purpose a substance must be employed which has no action on the stannate of soda or potash, such as the hydrated oxide of manganese, the hydrated oxide of iron, oxide of copper, &c.; but the patentee recommends the hydrated oxide of manganese, obtained by the action of lime on a soluble salt of manganese, as, for instance, the muriate of that metal, as affording the cheapest material for effecting the desired object; and he directs the solution of stannate of soda or potash, obtained from twenty parts of tin ore, in the way above described, to be boiled with eleven parts of dry oxide of manganese in an equivalent of hydrated oxide of that metal, until no more sulphur remains in the solution, which may be ascertained by testing the solution from time to time, by means of a test paper, dipped in a solution of acetate or other soluble salt of lead, and the oxide of manganese is to be added as long as the lead paper is blackened or darkened when applied to the solution of stannate of soda or potash under operation. The stannate of soda or potash solution is then filtered or decanted off from any insoluble matters, and boiled down to any required consistence, or crystallized in the ordinary way. If hydrated oxide of iron, or oxide of copper, be employed in place of the oxide of manganese, an equivalent quantity of either of these oxides must be used.

Another method of obtaining the stannates of soda and potash consists in exposing the tin ore, or black tin, to the action of an alkaline earth, at a high temperature; either lime, baryta, or strontia, may be employed for this purpose. To effect the preparation of stannate of soda by this process, the patentee directs that six parts of tin ore (black tin) be mixed with four parts of lime, previously slaked, and made into a pulpy consistence with water; this mixture is then to be dried, and submitted to a full red heat in a reverberatory furnace; this operation, the patentee states, he finds requires to be continued for about the space of four hours. When cool, the contents of the furnace are to be taken out, and added to a quantity of muriatic acid, equivalent to fifteen parts of muriatic acid, of sp. gr. 1.175, mixed with fifteen parts of water, by which means the whole of the alkaline earth is removed in the form of soluble muriate of lime, and the peroxyde of tin is precipitated. Care, however, must be taken, that no more muriatic acid be added than is sufficient to dissolve out the lime, otherwise a portion of the oxide of tin may be dissolved. The peroxyde of tin thus formed may be separated by filtration, or by decanting off the muriate of lime, and be dried in the ordinary way. If anhydrous baryta be employed in the place of lime, it is necessary to use 2¾ times the weight of the lime; if hydrate of baryta be employed, a quantity equivalent to that of the anhydrous baryta must be added; and if strontia be employed, an equivalent of that earth corresponding with the lime in the above process, must be made use of. In order to convert the peroxyde of tin thus obtained into stannate of soda, the peroxyde obtained by acting on six parts of tin ore, as above directed, is to be boiled with ten parts of caustic soda liquor, containing twenty-two per cent. of real soda, until the alkali has taken up all, or nearly all, of the peroxyde of tin or stannic acid employed, when a solution of stannate of soda will be formed, which may be evaporated or crystallized in the usual way.

If stannate of potash be required, the process as above described is to be followed, substituting ten parts of solution of caustic potash, containing thirty-two per cent. of real potash for the soda above employed.

The next process for obtaining the stannates of soda and potash is as follows:—Dissolve eleven parts of dry sulphate of soda in a convenient quantity of water, and, for the purpose of facilitating the operation, add to it three parts of solution of caustic soda, containing twenty-two per cent. of real soda, and the peroxyde of tin, the product of six parts of tin ore and eleven parts of baryta, heated together in a reverberatory furnace, as above described, and reduced to powder. Boil this powder in the solution of sulphate of soda, in an iron or other suitable vessel, until all, or nearly all, the peroxyde of tin has been separated from its combination with baryta. Stannate of soda will be contained in the solution, which may be separated from the insoluble sulphate of baryta by filtration or decantation in the usual way. If stannate of potash be required, an equivalent proportion of sulphate of potash, with three parts of solution of caustic potash, containing thirty-two per cent. of real potash, must be employed.

The patentee then proceeds to state his mode of obtaining stannate of lime. For this purpose, he directs a solution of one hundred and forty-three parts of stannate of soda to be mixed with thirty-eight parts of lime, slaked, and made into a pulpy consistence with water. This mixture is then to be boiled in an iron or other suitable vessel until the whole of the stannate of soda has been decomposed, and all, or nearly all, the peroxyde of tin or stannic acid has become combined with the lime. This may be ascertained by testing some of the liquid from time to time by means of lime-water; and if, on the addition of lime-water, no precipitate be produced, the process is completed. Sometimes, though rarely, it may be necessary to add more lime; but the patentee finds the proportion above indicated to be for the most part sufficient, and that the process is completed in about an hour. The stannate of lime so produced is precipitated to the bottom of the vessel, and caustic soda remains in solution, which may be again employed for the preparation of stannate of soda, or for any other purpose. Carbonate of lime, in an equivalent proportion, may be employed instead of lime in the above process, in which case the solution will contain carbonate of soda; but this process is not considered by the patentee so good as that in which lime is used.

If stannate of baryta, or stannate of soda, be required, an equivalent proportion of baryta or strontia, in powder or solution, must be employed in place of lime. Stannate of potash, in an equivalent proportion, may also be used in place of stannate of soda; but its employment is not so economical. From a stannate of lime, baryta, or strontia, prepared as above, a peroxyde of tin or stannic acid may be obtained, of great purity. This is effected by mixing the stannate of lime, for instance, with water, and adding this mixture to muriatic acid, in the proportion of ten parts of acid, of sp. gr. 1.75, for ten parts of real stannate of lime. The whole is to be well stirred together until the acid has removed the whole of the alkaline earth, which is usually effected in the course of half-an-hour; the solution of muriate of lime is then poured off, and the peroxyde of tin or stannic acid washed and dried in the usual manner. The peroxyde of tin may also be obtained in the same way, by using equivalent proportions of stannate of baryta and strontia. The peroxyde of tin or stannic acid thus prepared may be smelted in the ordinary way, and a very pure tin be produced.

In the foregoing processes, tin ore (black tin), of eighty to ninety per cent., has been the quality mentioned; but if the tin ore employed be of less value, the proportion of it used must be regulated accordingly.

In the above processes for obtaining stannate of soda and stannate of potash, it will be found that a portion of free alkali always remains in the solutions of these salts; but the patentee gives no directions for the removal of this alkali, as he considers its presence to be more advantageous than otherwise.

The patentee next describes the mode of carrying out the second part of his invention, which consists of an improved process or processes for obtaining lead from ores or slags, and a combination of lead and antimony from slags containing those metals. The native carbonate of lead, or white lead ore, is found to contain much silica, which, when the ore is smelted, gives it a tendency to flux or run together like glass. To prevent this, and to obtain the pure lead, the patentee directs that, for every twenty parts of silica contained in the white lead ore, thirty parts of peroxyde of iron, and a sufficient quantity of small coal, be mixed with the ore, previously ground to powder, and the resulting mixture smelted in the usual way; the peroxyde of iron combines with the silica, and the lead is thus readily obtained. In the case of galena, or the common ore of lead, four parts of peroxyde of iron, and two of small coal, are to be mixed with twelve parts of galena, previously ground to powder, and the resulting mixture smelted in the usual way. In this case, part of the peroxyde of iron unites with the sulphur of the galena, and forms a sulphuret of iron, whilst the other part combines with the silica. The patentee, after stating that considerable loss is experienced from the smelting of lead slag, by the mode at present adopted, arising from the great heat of the slag hearth required for smelting these slags, causing the volatilization of large quantities of lead, recommends the addition of peroxyde of iron to the slag, previous to smelting, in proportion to the quantity of silica contained in such slag; and further states, that such mixture of slag and peroxyde of iron may be smelted in an ordinary lead furnace, thus rendering the great heat of a slag hearth unnecessary, and consequently avoiding the loss of considerable quantities of lead. In the case of slags containing a mixture of lead and antimony, the patentee directs the addition of peroxyde of iron, in proportion to the silica contained in the slags, after which they are to be smelted in the usual way. In all these cases, the patentee directs that an excess of peroxyde of iron should be employed, rather than a diminished proportion.

Having thus stated the nature of his invention, the patentee claims—Firstly, a means of producing a stannate of soda, by heating together a mixture of tin ore and sulphuret of sodium; and a stannate of potash, by heating together a mixture of tin ore and sulphuret of potassium, and afterwards separating the sulphur from these mixtures respectively, and replacing it by an equivalent of oxygen, by means of a metallic oxide, in the manner hereinbefore described.

Secondly, the mode of subjecting a mixture of tin ore and an alkaline earth to a high degree of heat, and, after removing the alkaline matter, combining the remaining peroxyde of tin, or stannic acid, with soda, to produce stannate of soda; and with potash to produce stannate of potash, in the manner hereinbefore described.

Thirdly, the mode of boiling the product which has been obtained, by subjecting a mixture of tin ore and baryta to a high degree of heat, in manner aforesaid, in a solution of sulphate of soda, to produce stannate of soda; and in a solution of sulphate of potash, to produce stannate of potash, as hereinbefore mentioned.

Fourthly, the mode or modes of producing, in manner before described, from the stannate of soda and stannate of potash, the stannates of lime, baryta, or strontia, respectively, whether they are intended to be used for the purpose of making pure tin, or peroxyde of tin; or for any other purpose to which the said stannates of lime, baryta, or strontia may be applied.

Fifthly, the mode of producing lead from native carbonate of lead ore, by smelting that ore with peroxyde of iron and small coal, in manner hereinbefore described.

Sixthly, the mode of producing lead from galena, or common ore of lead, by smelting that ore with peroxyde of iron and small coal, in the manner hereinbefore described.

Seventhly, the mode of producing lead from slags of that metal, by smelting such slags with peroxyde of iron and small coal, in the manner hereinbefore described.

Eighthly, the mode of producing a compound of lead and antimony from ores containing those metals, with peroxyde of iron and small coal, in the manner hereinbefore described.—*Patent Journal and Inventors' Magazine.*

PROCESS FOR ESTIMATING THE QUALITY OF OPIUM.

BY M. DE VRY.

M. Guillermond has published a process for determining the quantity of morphia contained in opium (see vol. ix., page 236 of this Journal). As the morphia obtained by that process contains some of the narcotine of the opium, I have adopted the following modification of the process. The mixture of morphia and narcotine obtained by precipitating the alcoholic solution with ammonia, after being washed, is heated with a slight excess of sulphate of copper dissolved in pure water. I have found from experiment, that morphia decomposes sulphate of copper into sulphuric acid, with which the morphia combines, and tribasic sulphate of copper, which is an insoluble salt, while the narcotine has no action on sulphate of copper. In this way we obtain a solution of sulphate of morphia with a little sulphate of copper, while the narcotine remains undissolved with the sub-sulphate of copper. After filtering the liquor, the copper is precipitated by sulphuretted hydrogen, and the morphia by ammonia. With this slight modification the process of M. Guilliermond is not only a good one for determining the proportion of morphia contained in the opiums of commerce, but it may also be advantageously applied for preparing the alkaloid, which is thus obtained pure and almost without colour.—*Journal de Pharmacie.*

ON THE VARIABLE QUALITY AND STRENGTH OF OPIUM.

BY M. A. CHEVALLIER.

There is no one of the active substances employed in medicine that is more used than opium. The preparations of this drug, which are daily prescribed by medical men, who ought to be able correctly to estimate their action, are, in the majority of cases, of variable strength in different shops. In fact, the origin of the opium employed, its greater or less state of purity, its hygrometric condition, and the adulteration to which it may have been subjected, must give rise to preparations which, although bearing the same name, have not the same medicinal properties. The Codex, in ordering opium in the opiate preparations, uses the terms "choice opium;" but the choice may be made from the opiums of Smyrna, Constantinople, or Egypt.

If the opium of Smyrna be chosen, the preparations in which there are 500 parts of opium will contain from 28 to 32 parts of morphia.

If the opium of Constantinople be used, the same quantity of preparation will contain from 14 to 16 parts of morphia.

Finally, if Egyptian opium be employed, which contains the smallest proportion of morphia, there will be present only from 10 to 12 parts of this substance in the above quantity.

If one Pharmaceutist selects Smyrna opium and another the opium of Constantinople, the preparations may, in both cases, be made with "choice opium," and yet contain different proportions of morphia, the one being more than double the strength of the other. Should this be done by Pharmaceutists living in the same locality serious accidents might occur, from a patient habitually taking the weaker preparation until the dose had been greatly increased, and then getting the medicine from the other establishment where the stronger preparation was the one kept.

These considerations are of the highest importance, and deserve the attention of Pharmaceutists and also of Government.

The hygrometric condition of even choice specimens of opium is very variable. Six samples of Smyrna opium obtained at the same time from different houses, were found to contain the following proportions of water:

No. 1	contained	33.50	per cent.	of water.
2	"	35.	"	"
3	"	40.50	"	"
4	"	42.25	"	"
5	"	52.50	"	"
6	"	53.	"	"

It will thus be seen that the last specimen contained 19.5 per cent. of water more than the first.

Besides these sources of discrepancy in the strength of opiate preparations, it is, unfortunately, notorious that opium is sometimes adulterated, so that the conscientious Pharmaceutist ought to analyse every specimen of opium that he uses.

I would suggest, therefore, that none but Smyrna opium should be used in Pharmaceutical preparations, and that even this should be analysed before using it.—*Journal de Pharmacie.*

The above subject was discussed at a meeting of the Pharmaceutical Society of Paris, on the 3d of April, when M. Mialhe stated as the result of his experience, that the proportion of morphia in opium varies from one per cent. to ten per cent. He stated also, that extract of poppies contains only 0.8 per cent. of morphia.

M. Soubeiran confirmed the statement of M. Mialhe.

M. Guibourt, on the other hand, said he obtained from 15 to 17 per cent. of morphia from Smyrna opium.

At a subsequent meeting of the Society, M. Dublanc renewed the discussion, and stated that he had never obtained more than fourteen per cent. of morphia from opium, while sometimes the proportion is not more than one, two, or three per cent. In estimating the quantity, he adopted the process recommended by M. Guillermond.

M. Guibourt repeated his statement that Smyrna opium contains from sixteen to eighteen per cent. of morphia; and this quantity had been obtained not only by himself, but also by Messrs. Caventou and Aubergier.

M. Guillemette said he used large quantities of opium in the preparation of morphia, and that he rarely got more than fourteen per cent. of the alkaloid. Good specimens generally contained from ten to twelve per cent.

M. D. Vry, in a note appended to his paper on the mode of determining the morphia in opium, gives the results of the analyses of twenty-one specimens of what was considered good commercial opium, which are as follows :—

No. 1	only traces of morphia
2	0.09 per cent.
3	1.7 "
4	2.3 "
5	2.3 "
6	2.3 "
7	2.4 "
8	2.4 "
9	3.0 "
10	3.1 "
11	3.2 "
No. 12	3.2 per cent.
13	3.9 "
14	4.0 "
15	4.0 "
16	4.3 "
17	4.3 "
18	5.4 "
19	6.6 "
20	7.2 "
21	9.2 "

ON TINCTURE OF IODINE.

BY DR. A. GÖPEL.

THE author has examined the proportion of iodine in tinctures of iodine which had been kept for various periods. In order to determine the proportion of free iodine, the tincture was shaken, according to Herzog's directions, with metallic copper, but the author employed, not copper turnings, but copper obtained by precipitation with metallic iron from a hot, acidulated solution of sulphate of copper.

The tincture of iodine was prepared by mixing iodine with ten times its weight of alcohol of 90° Tr., and left standing in a very large bottle for three weeks, at a temperature of 25° to 30° Cent., the bottle being opened daily several times and shaken ; after this it was placed for five weeks in a warm room at the window, and daily exposed for several hours to the light of the sun. During the first eight weeks, 8.28 per cent. of iodine had become combined; after four weeks more, 1.85 per cent.; and in two successive equal periods, 1.92 and 1.97 per cent. respectively.

The loss of free iodine was now examined in a tincture prepared with the same proportions as the preceding, and kept in the dark at a low temperature. In eight weeks, 0.64 per cent. of iodine was lost ; after four weeks more, 1.02 per cent. Thus, during the space of one quarter of a year, only one per cent. of iodine was lost, or at least became ineffective. The properties of the colourless liquids obtained by filtration from the iodide of copper (generated by shaking the tincture of iodine with copper) were as follows : they possessed an agreeable ethereal odour, reacted strongly acid, left no residue on being evaporated at a gentle heat, and developed at first acid vapours of hydriodic acid only. Solution of silver produced an abundant, light yellow precipitate, which became grey on being boiled with water. Protonitrate of mercury caused an abundant yellow precipitate. Acetate of lead produced a white turbidness on the addition of ammonia, but so that the liquid still reacted upon litmus, a white, caseous precipitate was formed, which easily dissolved in acetic acid. Acetate of copper produced no precipitate.

The fourth part of the acid liquid was then distilled off. The product was neutral, possessed the same agreeable odour as the original liquid, and yielded no precipitate with a solution of silver. The residue in the retort reacted as the first liquid. The acid liquid was now mixed with an excess of carbonate of potash, and a third part distilled off, when the new liquid had even a stronger ethereal odour than the first : the residue consisted of a solution of carbonate of potash and a supernatant liquid. The latter, on being evaporated, left a small quantity of a yellow salt, which, heated on platinum foil, became black, and emitted an offensive burnt smell, leaving behind alkaline iodide of potassium. Half of this salt was repeatedly boiled with ether, which became light yellowish ; on being evaporated, it left behind a small quantity of a thickly yellow liquid of an acrid taste. This liquid, mixed with water, yielded with a solution of silver a white flaky precipitate, almost perfectly soluble in ammonia and nitric acid. Protonitrate of mercury produced a white flocculent precipitate, at first soluble in nitric acid, but afterwards becoming white and turbid. Chloride of mercury caused no precipitate.

The remaining half of this salt was boiled with absolute alcohol. When evaporated, a yellowish salt remained behind, which was not examined quantitatively, but possessed the following properties :—A watery solution gave, with a solution of silver, a light yellow precipitate, which became black on being boiled, and imparted to the glass a brilliant coat of reduced silver. When the solution of silver had not been added in excess, the reduction by boiling was very imperfect. An addition of acetic acid entirely prevented the reduction ; the precipitate became black, and the liquid reddish. Also, when precipitated in a cold state, the clear filtered liquid, yielded, on being boiled, but a small quantity of black powder, but the glass remained clean. From the precipitate, nothing was extracted by ammonia or acetic acid which could yield reduced silver on being boiled. Protonitrate of mercury produced a dirty, yellowish, grey precipitate. Acetate of lead a white turbidness, disappearing in acetic acid. Sulphate of copper a slight white turbidness.

Most of the iodine that had become combined in the tincture was contained in it, as hydriodic acid [*Iodwasserstoff*] and iodide of ethule.—*Pharm. Central Blatt*, 1850, No. 13.

ON THE PRESENCE OF IODINE IN FRESH-WATER PLANTS.

BY M. AD. CHATIN.

By verifying the circumstances pointed out by Müller (Lindley's *Vegetable Kingdom*, page 363), viz., the presence of iodine in a species of cress of unknown origin, M. Chatin has ascertained that iodine exists in the common water cress, and that this fact is neither peculiar to this species, nor common to all crucifers ; that iodine is entirely absent from, or that, at all events, it cannot be found in terrestrial, whilst it is always present in aquatic plants ; that of the latter, those living in running contain more iodine than those living in stagnant water ; that, if the stagnant water is large enough to be much disturbed by the wind, the quantity of iodine in the plants growing in the water is more nearly equal to that in plants found in running water; that the quantity of iodine found in plants is, as a general rule, independent of their nature, but dependent on their habitat. This is shown by confervas, potamogetons, nymphæas, ranunculuses, cresses, which are all equally rich in iodine when in running water, and all equally poor when in stagnant pools; and that the iodine is not combined with the tissue of the plant, but exists in alkaline iodide dissolved in the sap.

Among the plants, from the examination of which the above results were deduced, M. Chatin enumerates the yellow alyssum (*alyssum saxatile*), cabbage (*brassica oleracea*), shepherd's purse (*capsella bursapastoris*), erysimum, wall-flower, horse-radish (*cochlearia armoracia*), radish (*raphanus sativus*), as being all terrestrial crucifers, containing no iodine. Water cress (*nasturtium officinale*), *nasturtium amphibium*, *conferva crispata*, *chara-fœtida*, *fontinalis antipyretica*, bullrushes (*typha angustifolia and minima*), *scirpus lacustris*, *reed* (*arundo phragmites*), *acorus calamus*, *sagittaria*, *potamogeton crispum and pectinatum*, *beccabunga*, *phellandrium aquaticum*, *gratiola*, water ranunculus, all are crucifers and other plants containing more or less iodine.

Whence comes the iodine which is found in fresh-water plants? They certainly do not form it. It is impossible that it should be derived from the salt springs and mineral sources in which it has been detected by Angelini, Cantu, O. Henry, and others; for it is found not only in plants growing in large rivers, such as the Seine, the Marne, and the Isère, but also in those growing in every brook, pond, and marsh. It comes, M. Chatin concludes, from every part of the earth from which, associated with chlorides, it is dissolved out by the flowing of the water. This explains why plants in running streams contain the most iodine; for, in them, one portion of the water is no sooner deprived of this element, than more water, with a fresh supply, arrives, to be exhausted in its turn.

And how does the iodine get into the plants? Is it through their whole surface, which separates it from the water by a peculiar action, as oxygen is, according to M. Ad. Brongniart's ingenious theory, separated in the process of respiration? Or does the iodine enter along with the water, either by the surface or the roots of the plants, and then become concentrated in their tissues, in consequence of the exhalation of the same water, thus destroying M. Dutrochet's theory, that plants which live in water do not transpire?

This discovery of the existence of iodine in fresh-water plants explains the anti-scrofulous, anti-tuberculous, and other similar properties of phellandrium, water cresses, brook lime, &c., and the reason of the preference given to those plants which grow in running streams, as well as of the common custom of prescribing the habitual use of aquatic plants for persons living in those countries in which *goitre* is endemic. The water in which the ashes of these plants have been washed may be used for the same purpose, unless it be found more advantageous to extract the iodine from them.

M. Chatin, in analysing the plants, carefully calcined them, washed the ashes with boiling water, and tested for iodine with starch, sulphuric acid, nitric acid, and nitrate of potash and sulphuric acid. The discolouring of the liquids, and the volatilization of the iodine by the application of heat, were always used as checks. According to their richness in iodine, the plants furnished an intense violet colour immediately, or the same colour after the lapse of a short time, or a violet-purple colour immediately, or after a more or less long space of time.

In making these operations, several precautions are necessary. A portion of the iodine will be lost if the plant to be calcined be not moistened with a solution of caustic potash, and, when this is done, the ashes become inconveniently fusible. Saline mixtures, especially if rich in carbonates, mark the reaction more or less, particularly that of chlorine. The iodine disappears with great rapidity in solutions which are either too hot or too concentrated, and it is not easily to be detected in solutions that are a little too weak, &c.—*Comptes Rendus*, and *Gardeners' Chronicle.*

ON THE PRECIPITATION OF THE COLOURING MATTER OF SUGAR BY A METALLIC OXIDE.

BY HENRY WARBURTON, F.R.S. F.G.S., &c.

(In a Letter to Professor Graham.)

ALLOW me to put upon paper what I said to you the other day, respecting the experiments I made many years ago (the year of Mr. Howard's death) with the view of precipitating the colouring matter of brown sugar in combination with a metallic oxide.

My assistant was a gentleman, related by marriage, to Mr. Howard, and his operator in all the experiments on sugar-refining and filtering connected with Mr. Howard's patents. He gave me the information I was in want of, as to the strength of the syrups at which it would be requisite to effect the precipitation of the colouring matter, in order to render any process of that kind available to the sugar refiner. He prepared for me a small apparatus for filtering the syrups at a boiling heat, and pronounced judgment on the results obtained.

The metals I used were iron, lead, zinc, and *tin*. Iron I at once abandoned. Lead, I was afraid of, though, with the sub-acetate, followed by a little sulphuric acid, and that followed by a little hydrate of lime, I obtained very colourless results.

With the sulphate of zinc the results were very good. A solution of this salt was first mixed with the syrups, and then hydrate of lime was added, equivalent to the sulphuric acid in the salt. One experiment of this kind was made on the great scale at the boiling-house of a firm with whom Mr. Howard was connected as to his patents, and was regarded by them as highly promising. However, Dr. Wollaston found a trace of zinc in some of the syrups which had been thus treated, and I was afraid of zinc also.

The best results of all were obtained with sulphate of tin; and one experiment, on the large scale, was made with this salt at the boiling-house of the firm referred to. I am sorry that I cannot lay my hand on my cotemporary memoranda of the details of all my experiments with this salt; and you must be content, therefore, with the outline of them, which I now give from memory.

The salt was prepared by precipitating the copper of blue vitriol with grain tin, the latter being finely granulated by crushing it in a wooden bowl while hot by a wooden pestle; and to prevent the copper from coating the tin as it precipitated, clean copper-plates were immersed in the liquid with the tin. Perhaps the best way would be to make the precipitation in a clean copper vessel. To hasten the precipitation, I sometimes added an excess of sulphuric acid; and I kept the vessels cool by immersing them in water. I could not obtain a strong solution of tin in sulphuric acid by the direct action of sulphuric acid on tin: a quantity of subsulphate, or insoluble oxide, in his case, was also formed.

After adding a solution of the sulphate of tin to the syrup, a quantity of hydrate of lime, rather more than equivalent to the sulphuric acid, was superadded, and then the syrup was boiled by steam and filtered hot, in a vessel surrounded by steam. I also used, with great success, as a precipitant of the sulphuric acid, freshly precipitated hydrated oxide of lead. But this was only in experiments on the small scale.

Astonishingly perfect results are obtained with the sulphate of tin, when you operate with *dilute syrups*. The difficulty consists in effecting a complete precipitation of the colouring matter in *the syrups of the strength usually employed by the refiner*. Dr. Wollaston did not find any oxide of tin in the syrups treated with tin.

My friend, Mr. Howard's relative, always advised the final employment of a small quantity of animal charcoal, as it gave a *fluidity* to strong syrups, that could be obtained in no other way. In our small experiments, we added a *soupçon* of animal charcoal, after the tin and lime had done their work.

As I made these experiments only for my own amusement, and to serve Mr. Howard's family, if his relatives or the firm thought fit to persevere in them, I left the matter in their hands. But this was the critical period for them, when the refiners were just beginning to take out licences to boil sugar under Mr. Howard's patents; and their opinion, which appeared to me a well-founded one, was, that any new improvements, suggested at that period, would tend to unsettle the minds of the refiners, and rather deter them from making up their minds to apply at once for a licence.

I conclude that all the tin employed may be recovered, without difficulty, from the precipitate, which will be a mixture of gypsum and vegetable matter combined with oxide of tin. It would be a saleable article to metallurgists; so also will the precipitated copper be.

I shall be curious to know whether any experiments you may make with the sulphate of tin prove satisfactory. Of course, any other soluble salt of tin will answer, when the dissolving acid is neutralized by lime or an alkali, subject to the condition, that the new compound thus formed is not soluble in the syrup.

ON THE VOLATILE OIL OF BITTER ALMONDS.

BY DR. C. G. MITSCHERLICH.

MITSCHERLICH has examined the effect of the volatile oil of bitter almonds on rabbits. The experiments of Wöhler and Frerichs had shown that two drachms of this oil given to a dog cause sickness, but not death. The urine of the dog contained hippuric acid. Former statements, concerning the very poisonous character of this oil, tended to show that it is very difficult to deprive it completely of prussic acid.

Mitscherlich applied an oil which had been freed of prussic acid by being shaken with quick-lime and a protosalt of iron, and then distilled. His results were as follows:—

One and two drachm doses, introduced into the stomach of the animal by means of an elastic tube, acted powerfully as poisons, but less so than the essential oil of mustard, though stronger than the volatile oils of savin, caraway, cinnamon, nutmeg, fennel, turpentine, lemons, juniper, and copaiva. It is absorbed by the stomach, and partly eliminated by the kidneys and lungs. In small doses it is, as Wöhler and Frerichs state, oxydized in the organism and converted in hippuric acid. In larger doses, however, the oxydation is not perfect, part of the volatile oil passing unchanged in the urine, where it is easily discovered as well as in the exhaled breath. The principal fatal symptoms are cessation of voluntary motion and of sensibility, whilst the breathing and the motion of the heart, which are accelerated by the poison, still continue. In the intestinal canal it causes changes of structure similar to those caused by the oils before-mentioned. Oil of bitter almonds, not deprived of its prussic acid, acts as a poison in small doses only in consequence of this acid. Even with rabbits quantities of one scruple did not produce any considerable morbid symptoms. The fatal effect is common to many other volatile oils, which are also not fatal in small quantities.—*Central Blatt*, 1850, p. 329.

ON A QUALITATIVE TEST FOR NITRIC ACID.

BY JAMES HIGGIN.

The methods in ordinary use of detecting nitric acid do not show very small quantities, and the liquid suspected to contain nitrates has generally to be concentrated before the presence of nitric acid can be ascertained.

Being engaged lately in testing for nitrates in water, I employed the following method with perfect success. It is founded on the immediate liberation of iodine from hydriodic acid by nitric acid, and its subsequent detection by starch.

To insure accuracy, certain minutiæ have to be attended to; and these observed, the test becomes one of great delicacy.

1. The solution of iodide of potassium must be very dilute, or iodine is liberated by sulphuric acid alone.

2. The solution of iodide of potassium must not be added to the mixture of sulphuric acid and liquid till cold, or iodine is apt to be liberated without the presence of nitric acid.

3. The proportion of sulphuric acid added to the suspected liquid must not be too great, or the most dilute solution of iodide of potassium gives iodine without nitric acid.

4. As the solution of hydriodic acid formed by the action of sulphuric acid upon iodide of potassium is decomposed by the air in the course of an hour or two, and a blue formed with starch, unless a distinct colour is produced in ten to fifteen minutes, it may be concluded that nitric acid is not present.

I dissolve 25 grs. of iodide of potassium in 16 oz. of water for the test solution, which is too dilute to give iodine with sulphuric acid alone.

To the suspected liquid in a test-tube I add not more than one-sixth of its bulk of concentrated sulphuric acid; heat nearly to a boil, and keep hot in the sand-bath for several minutes; cool the tube in cold water, and add a drop of starch-mucilage and a few drops of the test solution. If nitric acid is present, the liquid assumes a blue, very intense, with even $\frac{1}{500}$th part of nitric acid.

With	$\frac{1}{500}$th	part by weight	of NO_5,	intense dark blue.
"	$\frac{1}{1000}$th	"	"	dark blue.
"	$\frac{1}{5000}$th	"	"	dark blue.
"	$\frac{1}{10000}$th	"	"	paler blue.
"	$\frac{1}{12000}$th	"	"	pale blue.
"	$\frac{1}{16000}$th	"	"	blue tint.
"	$\frac{1}{18000}$th	"	"	blue tinge.
"	$\frac{1}{20000}$th	"	"	faint blue tinge, becoming decided in a few minutes.

It is remarkable that even with the great excess of sulphuric acid present the whole of the nitric acid is not liberated until after heating some time; thus $\frac{1}{16000}$th part required ten minutes heating before the test would indicate nitric acid; $\frac{1}{18000}$th I heated twenty minutes, and $\frac{1}{20000}$th I found necessary to heat half an hour before testing.

Probably, by observing the same method, the other tests for nitric acid, viz., protosulphate of iron, sulphate of indigo and gold leaf, might become more delicate; but this I have not tried.

Of course some other acids would give the same results, as the chloric and chromic acids, &c.; but the absence of these is easily ascertained, and they occur seldom in analysis.—*Chemical Gazette.*

PREPARATION OF METACETIC ACID IN LARGE QUANTITIES.

BY F. KELLER.

A convenient quantity (two or three lbs.) of bran is mixed to a semi-fluid consistence, with ten times its weight of water at 50°—60° C. (122°—140° F.), and with a fourth-part of coarsely-divided leather (scrapings of tanned ox-hide are the best adapted to the purpose); pounded chalk is then added, and the whole left to ferment in a warm place. The process is complete in the course of three or four weeks in winter, and in a few days in summer; its termination is indicated by the sinking together of the mass, which was previously spongy and intumescent. The mass is then strained and washed with hot water; the lime-salt converted into soda-salt; and the acid separated by sulphuric acid. To separate any acetic or butyric acid that might be present, a portion of the liquid was saturated with carbonate of soda, the rest added to it, and the free acid separated from the saline residue by distillation. This residue was found to consist of a mixture of acetate and metacetate of soda. In all subsequent experiments which the author made with the view of discovering the presence of any other acid besides metacetic, the silver-salt prepared from the residue was found to have the same composition, viz.:—

	Calculated.		Found.
C_6	36	19.89	19.73
H_5	5	2.76	2.72
Ag	108	59.55	59.32
O_4	32	17.80	18.23
	181	100.00	100.00

The silver-salt, when newly prepared, may be recrystallized from hot water, without perceptible blackening; but after drying over sulphuric acid, it is for the most part decomposed by boiling with water. The lead-salt prepared by saturating the pure acid with hydrated oxide of lead formed a radiated crystalline mass, which, when heated by the hand, deliquesced to a viscid liquid. The baryta salt dried up to a gummy mass, but after a while swelled up in cauliflower-like tufts, which effloresced and fell to pieces on exposure to the air. This salt contains 36.38 per cent. (9 at.) of water of crystallization, which it loses when heated to 140° C. 1.43 grammes treated with sulphuric acid yielded 1.186 $BaO.SO_3 = 54.42$ per cent. baryta. The soda-salt was only once obtained in the crystalline state, after being heated to fusion and then dissolved in the smallest possible quantity of water. It was generally obtained in the form of a greasy mass. All these salts, when thrown upon water in small fragments, exhibit a rotatory movement, similar to that of the butyrates.—*Ann. Ch. Pharm.*, lxxiii., 205.

ON THE PREPARATION OF CHLORATE OF POTASH AND OTHER CHLORATES.

BY F. CRACE CALVERT, F.C.S.,

Professor of Chemistry to the Royal Institution of Manchester.

Owing to the importance which chlorate of potash has acquired within the last two or three years in our manufacturing districts, due principally to its application as an oxidizing agent in steam colours, to raise their intensity and increase their beauty, and also in consequence of the high price which commercial potashes have attained during the last two years, without any prospect of becoming cheaper, I was induced a few months back to try if any other chlorate could be introduced as a substitute for that of potash; and also whether a cheaper method could not be devised for manufacturing that important commercial product, of which the useful application as an oxidizing agent is greatly impeded by its high price. For it is well known that potashes have averaged for the last two years from £2 to £2 5*s.* a hundred weight, which quantity does not contain above 39 to 41 per cent. of potash, the remaining amount of alkali often quoted to exist in the salts being soda. It may be stated that in all the potashes which I have analyzed, I have uniformly found from 10 to 12 per cent. of soda.

My attention was first directed to the preparation of the chlorate of lime, which I produced by passing a current of chlorine gas into a thick milk of lime nearly boiling. It appeared, after several experiments, that heat had great influence in assisting the oxidation of the chlorine. For whilst at ordinary temperatures I could only obtain hypochlorite of lime at about 200° or 212° Fahr., little or no hypochlorite was formed, but a large amount of chlorate of lime.

It will be seen immediately, that it was the observation of the remarkable influence of a temperature of about 212° Fahr., to increase the degree of acidification of chlorine, which led me to the discovery of a new method of preparing chlorate of potash.

I tried for some time to find a mode of separating chlorate of lime from chloride of calcium. But the chlorate is not to be separated with facility from the highly deliquescent chloride of calcium.

A curious chemical reaction was observed to take place several times, during the numerous trials which were made on this point. It was that large amounts of pure oxygen were often given off; and on every recurrence of such an action, no chlorate was produced.

I next directed my attention to the preparation of the chlorate of baryta, the commercial manufacture of which would have been greatly enhanced by the recent opening of an extensive mine of carbonate of baryta at Pride Hill, in Wales, near Shrewsbury. The mineral referred to, yields on an average ninety per cent. of pure carbonate. In fact, its high degree of purity has caused its successful application at the potteries, and also in the finishing of calicoes, as a substitute for carbonate of lead in the glazing of cards, &c.

I at first followed the process described in chemical works, namely, the passing of a current of chlorine gas through water holding carbonate of baryta in suspension. Instead of forming chlorate, I only produced a hypochlorite; but when a heat of from 200° to 212° Fahr. was communicated to a thick milk of carbonate of baryta, one of the neatest chemical reactions took place, for the whole mass was transformed into chlorate of baryta and chloride of barium.

It appeared to me at the time that a cheap substitute for chlorate of potash was thus obtained. But I was deceived; as it was found impossible to separate in a satisfactory manner the chlorate of baryta from the chloride of barium, even by seven or eight consecutive crystallizations from water. Though certainly the chlorate was becoming gradually purer, still it was impossible to free that salt completely from chloride of barium. Although this coincidence in the solubility of these two salts had been remarked by Chenevix, still, as in most works, the chlorate of baryta is stated to be employed to prepare chloric acid, I persevered, but regret to say in vain. I even tried to separate these two salts, by treating them with rectified spirits and wood naphtha, or the hydrate of oxide of methyl, but without success.

I next directed my efforts to discover a cheaper method than those hitherto known, of preparing the chlorate of potash.

It is necessary here to mention, that the chlorate of potash is not now generally manufactured by passing chlorine into a concentrated solution of carbonate of potash, but that the useful process recommended by Professor Graham, namely, of carrying a current of chlorine through a mixture of sulphate of potash and lime, has been generally adopted, and has given satisfactory results.

I placed myself in the best circumstances for ascertaining the relation of this process to the one hereafter described. One equivalent or ninety-seven parts of sulphate of potash, dissolved in a sufficient amount of water, and mixed with six equivalents of lime, or 168 parts, was submitted to a current of chlorine, at 212° Fahr. Although chlorate of potash was formed in this experiment, yet its quantity was inferior to the theoretical amount, namely, 122.5 parts.

From this, and other experiments, and also from information which I have obtained, I find, that commercially, 122.5 parts of chlorate of potash are never produced from 97 parts of sulphate of potash. No doubt, this result is due to the formation of a certain amount of chloride of potassium, in addition to the imperfect decomposition of the sulphate of potash by the lime.

A mixture of chloride of potassium with lime was also submitted to experiment, but yielded no satisfactory results.

It was several months after my researches were completed, that I learnt from Professor Graham himself, that he had published in the *Transactions of the Chemical Society*, vol. i., p. 5, a short notice on the production of the chlorate of potash by means of a mixture of carbonate of potash and lime. Still this chemist has not inquired into the precise bearing of his interesting observation as to the best mode of conducting the process commercially, and the amount of chlorate produced.

I was led by a series of consecutive trials to examine what would take place by passing chlorine gas at ordinary temperatures through a solution of caustic potash, containing caustic lime in suspension. Under these circumstances, I only produced the hypochlorites of potash and lime, and the chlorides of potassium and calcium; but if the chemical action was assisted by heat, chlorate of potash was formed in large amount instead of hypochlorite.

It is certainly interesting to see in this series of experiments, how a comparatively small increase of temperature (from 60° to 180°) modifies chemical action, and assists the fixation of an additional amount of oxygen by the chlorine.

Having been successful so far, my attention was next directed to the best means of producing by this method the largest amount of chlorate of potash, an object which I arrived at by examining the influence of solutions of caustic potash, more or less concentrated, upon the quantity of salt produced.

For my first experiment, a solution of caustic potash of specific gravity 1.040, at 60° Fahr., was taken, containing 34 grains of real potash in 1000 fluid grains of liquid. In order also to act always on the same proportion of potash, a constant bulk of fluid was taken, which contained exactly 100 grains of oxide of potassium. In this case, therefore, 3000 fluid grains were made use of, containing 102 grains of potash. I then took six equivalents of good quick lime, or 358 grains, which, after being slaked, were added. The mixture being heated to about 200° Fahr., a rapid current of chlorine was passed through, as long as the gas was absorbed. The whole was thrown on a filter, and the small deposit washed with boiling water. The liquor in cooling yielded a fair amount of chlorate, which was slightly increased by the concentration of the mother-liquor. The quantity was 130 grains of chlorate, or three times as much as potash alone would have given.

A second experiment was made with a solution of caustic potash of specific gravity 1.050, and containing forty grains of potash in 1000 fluid grains; consequently 2778 grains of this caustic solution were taken, and contained 100 grains of oxide of potassium. After being mixed with the required proportion of slaked lime, they were submitted to the operation above described, and gave 140 grains of chlorate of potash, exclusive of a small amount of that salt left in the mother-liquor. As an increase in the quantity of caustic potash for a given bulk of fluid appeared, therefore, favourable, a third trial was now made with a solution of specific gravity 1.070, containing 58.75 grains of oxide of potassium in 1000 fluid grains; or 1750 grains contained 102 grains of oxide of potassium. In this trial 158 grains of chlorate were produced.

Such details on the action of chlorine on solution of caustic potash at different strengths may be excused, as they afford an interesting illustration of the modifications which chemical actions may undergo in consequence of the influence of small changes, either in the mode of operating, or in the medium in which the reactions take place. The results perfectly corroborate the facts which I formerly observed respecting the action of ammonia on the nitrate of lead, as well as the remarks which I then made on the formation of the salts resulting from the action of these two compounds.

It was necessary to proceed very cautiously with this series of experiments, as I had remarked that if a particular strength in the solution of caustic potash was exceeded, I then produced chloride of potassium and less chlorate. Another serious impediment was also created by the liquor becoming so thick, by the amount of lime required for a given weight of potash, that the free passage of chlorine gas was prevented.

In a fourth experiment I took a solution of caustic potash of specific gravity 1.090 at 60° Fahr. A quantity of liquor containing 100 grains of potash gave 172 grains of chlorate.

In a fifth trial, a liquor of specific gravity 1.099 being used, 100 grains of potash gave 185 grains of chlorate, besides some left in the mother-liquor. This last quantity already exceeded more than four times that which potash alone would have furnished.

In a sixth experiment an enormous amount of chlorate was produced, amounting, as it will be seen, to nearly the theoretical proportion, namely, 260 parts of chlorate for 100 parts of potash; and I have no doubt that in manufactures, the amount produced would be still nearer, as the portion left in the mother-liquor would be comparatively less.

A solution was finally employed of caustic potash of specific gravity 1.110, or containing 10.233 per cent. of real potash; consequently the quantity of fluid operated upon, 1000 fluid grains, contained 102.33 grains of oxide of potassium. To this liquid was added 358 grains of quick lime previously slaked. The whole being slightly heated, a rapid current of chlorine gas was passed through, the temperature rising very fast to 180° Fahr., owing to the intensity of the chemical action. The operation was considered complete when the liquid refused to absorb any more gas; the whole was then evaporated nearly to dryness, the residue dissolved in boiling water, and the liquor filtered. After washing the slight deposit left on the filter, the whole of the liquors were evaporated for crystallization. The amount of chlorate of potash obtained in this experiment was equal to 220 grains, with some salt still left in the mother-liquors. The last no doubt amounted to nearly 20 grains, owing to the rather large bulk of mother-liquors which were reserved, so as to prevent the chlorate from being soiled with chloride of potassium.

It is certainly remarkable that there should be a determinate specific gravity where the chemical reaction is brought to bear to its fullest extent, or where, in other words, the whole of the potash is transformed into chlorate, while in solutions of greater or less specific gravity, a smaller quantity of chlorate is produced, with a corresponding increase of chloride of potassium. This chemical reaction is rendered still more worth of notice by the influence of the above fact in modifying the action of chlorine, relatively to its affinity for potassium or calcium. Thus, in a liquor of specific gravity 1.110, we find that calcium takes precedence of potassium, in combining with chlorine, and preserves the latter metal almost entirely from the action of chlorine; while the oxygen, disengaged from the calcium, applies itself to the chlorine, to transform the latter into chloric acid, which neutralizes the potash only. This, so far as I am aware, is the only example which chemistry affords, where, in the presence of two bases, the chlorine applies itself almost *entirely* to one of the metals, whilst oxygen attaches itself to the chlorine, converting it into an acid which neutralizes exclusively the second base, namely, the potash.

The commercial advantages of the above process over the old one, will be easily conceived, when we reflect that, in the latter, 105 parts of oxide of potassium yielded only 43 parts of chlorate, whilst, treated by the method here recommended, 100 parts of the same oxide give nearly 260 parts of chlorate of potash.

The chlorate may be produced by the new process at about sevenpence per pound; and might therefore be supplied on terms which are greatly below the present market price.

Before concluding, I have much pleasure in acknowledging the valuable assistance which I have received in this inquiry from one of my former pupils, Mr. Charles O'Neil, of this town.—*Quarterly Journal of the Chemical Society.*

COPAL AND COPAL VARNISH.

On the different sorts of Copal found in the market, and on the Mode of Manufacturing Copal Varnish for certain purposes.

BY M. R. SCHINDLER.

There are three sorts of copal to be found in the market, without either of them having any other name attached, whereby to ascertain this difference, than the terms East and West India copal, the latter term including two kinds very different from each other.

As to the East India copal, called also African copal, it is softer, more colourless, and transparent than the other varieties, always having a clean surface, and emitting an agreeable odour when heated. Its form is globular, and it would be as well at once to give it the name of *globular copal*, as a distinctive mark. This is the copal which furnishes the best varnish. Old oil of turpentine has but little action on this copal; more recently-distilled turpentine dissolves it completely; but not in a larger proportion than its own weight, or the excess of copal is precipitated. Rectified turpentine, or turpentine digested with sulphur, is able to take up double its weight of this copal without any precipitation—the solution, however, at this strength, is somewhat turbid.

Oil of rosemary, thick and old, only causes the copal to swell; that which has been newly rectified, or as it is usually met with in the market, provided that it has been carefully kept, dissolves the copal in any proportion, giving a clear yellowish solution, which, in the proportion of equal parts of oil and copal, remains fluid enough for use.

This kind of copal fuses much more readily than the other two. It is less volatile, and gives out no empyreumatic oil, but only some watery acid. If the operation be performed without access of air, fire carefully regulated, and the vessels so constructed as to allow the free disengagement of the liquid substances formed, this copal is not darker after than before fusion. As soon as it ceases to froth up, the fusion is complete, and then good oil of turpentine dissolves the copal in any proportion, and forms, according to the solvent used, a beautiful and good varnish for the metals, paintings, wood exposed to the air, leather, &c., &c.

The second kind of copal, called West India copal, or American copal, is imported in pieces almost always flat, and of a size scarcely exceeding three ounces in weight; it is very hard, has a rough appearance, and is without smell or taste. Its colour is yellowish, and never colourless like the preceding. Insects are very rarely to be found in it. It is brought from the Antilles, Mexico, and North America.

According to Lunery it exudes, in the Antilles, from a large tree, falls into the rivulets which run along the sides of the mountains, and from thence is carried away by the rivers, and thrown upon their banks. According to this Chemist, it owes its great hardness to its remaining a long time in water. If we carefully examine the exterior of this copal, we shall find that the outer layer, which is coarse, and not transparent, bears no impression either of sand or dirt, and rarely of leaves. Its exterior appearance gives no indication of subterranean origin.

Absolute alcohol dissolves it in so small a proportion, that no advantage is derivable from a spirituous varnish, although those which are thus prepared are very hard and durable. Rectified oil of turpentine dissolves, after a long digestion, a small quantity of this copal, and, when heated for some time, the solution becomes coloured; with new oil of rosemary it swells, but it is not dissolved.

It fuses also with much more difficulty than the globular copal, giving off much less watery acid, but a good deal of empyreumatic oil. Fused with access of air, it becomes entirely black, unless a large vessel be employed, in which the empyreumatic oil can be readily removed. It is also blackened by repeated fusions. As soon as the copal ceases to froth up, the fusion is complete. If it has not been sufficiently fused, or if an oil of turpentine, containing too much resin, be employed for dissolving the copal, a good deal of copal settles down from the solution. Notwithstanding most minute precautions, it is difficult to prepare a varnish with this copal, free from a brown colour.

The third kind of copal is imported in convex or concave pieces, weighing about half a pound each, often containing insects and vegetable substances. Its odour is aromatic, its consistence is not hard, and, when warm, it readily takes the impression of the nail. It is of the colour of hard copal, and, in order to distinguish it from the latter, I give it the name of *insect copal.*

Alcohol, oil of rosemary, and oil of turpentine act upon it in the same way as on hard copal. Its fusing point is between that of the globular and the hard copals. When in a state of fusion, it gives off less acid than the former, but much more oil (volatile as well as empyreumatic) than the latter; in other respects it resembles the hard copal. By careful treatment, a transparent varnish is obtained with it; but so soft and so slow in drying, that it would be as well altogether to reject its use in the manufacture of varnish.

To Prepare a Varnish for Coating Metals.—Digest one part of bruised copal in two parts of absolute alcohol; but as this varnish dries too quickly, it is preferable to take one part of copal, one part of oil of rosemary, and two to three parts of absolute alcohol. This gives a clear varnish, as limpid as water. It should be applied hot, and, when dry, it will be found very hard and durable.

To Prepare a Varnish for the Scales of Thermometers.—I recommend the following:—One part of copal, one part of oil of rosemary, and three parts of oil of turpentine, recently rectified or digested with sulphur. After a moderate digestion, the varnish is ready for use. This varnish dries quick, but is not so hard as the preceding, although it resists the action of the air and atmospheric influences.

For Varnishing Leather.—Especially of delicate colours, I recommend the following:—Six parts of oil of turpentine, saturated with caoutchouc, two parts of copal, and two parts of oil of rosemary. This varnish should be applied somewhat fluid, and always dried at a high temperature.

For Varnishing Furniture.—The fused copal dissolved in oil of turpentine is the most economical. If the copal has not been kept a sufficient time in a state of fusion, the varnish made with it remains soft for some time after it is dry, and afterwards peels off.

OBSERVATIONS ON THE FREEZING OF THE ALBUMEN OF EGGS.

BY JAMES PAGET, ESQ.,
Professor of Anatomy and Surgery to the Royal College of Surgeons.

The object of this paper is to illustrate a peculiar property of the albumen of the eggs of birds, a property which seems to have its purpose in preserving them from the injurious effects of very low temperatures.

Mr. Hunter observed that a fresh egg will resist freezing longer than one which has been previously frozen and thawed; and he referred this fact to the "vital power" of the egg in the first case, and the destruction of that power by freezing in the second. The author's experiments confirm those of Mr. Hunter, and prove, also, that when fresh eggs are exposed to very low temperatures, and also in the case of eggs which are decayed, or putrid, or the contents of which have been much altered by mechanical force or by electricity, a shorter time is sufficient for the freezing of such eggs, than is necessary for the freezing of those which are uninjured.

An examination of the rates at which heat was lost by the several eggs exposed to temperatures varying from zero to 10° Fahr., showed that fresh eggs, though they resist freezing longer than any others, yet lose heat more quickly; and that their resistance to freezing is due to the peculiar property of their albumen, the temperature of which may be reduced to 16° Fahr., or much lower, without freezing, although its proper freezing-point is at or just below 32°. Other than fresh eggs lose heat comparatively slowly, but freeze as soon as their temperature is reduced to 32°; fresh eggs lose heat more quickly, but may be reduced to 16° or lower; then, at the instant of beginning to freeze, their temperature rises to 32°.

That this peculiarity of fresh eggs is not due to vital properties, is proved by experiments which show that certain injuries, such as mechanical violence, addition of water, and others, which spoil their powers of resisting freezing, do not prevent eggs from being developed in incubation. By the same and other experiments, which are related, it is made probable that the peculiarity depends on the mechanical properties of the albumen; for, whatever makes the albumen more liquid than it is naturally in the fresh egg, destroys the power of resisting freezing.

The author could find no other substance possessing this property; and in evidence of its adaptation to the purpose of preserving eggs from the loss of their capacity of development, which they would suffer in being frozen, he relates experiments in which eggs were kept for a considerable time at temperatures ranging from zero to 10° Fahr., yet were afterwards developed in incubation. By the same series of experiments it was shown that, although freezing renders the effectual development of the germ impossible, yet the intensest cold, if freezing does not take place, has no similar result.—*Chemical Gazette.*

ON BREAD.

BY DR. F. KELLER.

Most of the rye-bread, especially that baked in the country, where the leaven is often left to itself for a whole week, has an unpleasant acid taste, which, according to the process of baking, can only originate from the presence of either *acetic* or *lactic acid.* To determine which of these acids is formed, an infusion of bread, prepared by washing slices of dried bread, was subjected to distillation, and the slightly acid distilled liquor, after being neutralized with carbonate of soda, evaporated in the water-bath. The crystalline form of the salt, which was formed on a watch-glass, was that of acetate of soda. The silver salt obtained from it yielded, on an average of two experiments, 65.11 per cent. of metallic silver, the acid was consequently *acetic acid*, and, according to this, the pores of the new baked bread are lined with a thin film of spirit of wine, generated during the fermentation, but which soon changes into the above-mentioned acid.

The residue was treated with alcohol and ether, in order to remove the gum and sugar, and then examined for lactic acid, but without success.

The analysis of the rye-bread used in the experiment, was,

Water	49.64
Unaltered starch	36.55
Nitrogenized extract with { starch sugar	4.55
Nitrogenized extract with { starch gum	3.69
Vegetable fibre	4.40
Salts	1.17
	100.00

During the process of baking, part of the insoluble gluten contained in the flour, passes over into the soluble modification of it; the proportion of nitrogen in the extract of bread was two per cent.

The bread which had been perfectly exhausted by water, and which, for the most part, consisted of unchanged starch, left behind, on being treated with diluted sulphuric acid, a nitrogenized substance, which was very analogous to the hordein of barley.

The proportions of nitrogen in rye-bread are as follows:—that of the dried bread was 1.8 per cent., that of the extract 2 per cent.; and that of the exhausted bread 1.6 per cent.

The exhausted bread forms 79.7 of the anhydrous bread, and the extract 17.93; the proportion of nitrogen is therefore calculated to be,

For the first	1.31
For the latter	0.37
	1.68 per cent.

which agrees nearly with 1.8.

The proportion of nitrogen in bread calculated by 100 parts, is,

In the extract	22 per cent.
In the residue	78 per cent.

Buchner's *Repertorium*, 1850, Bd. iv, H. 3, P. 336.

SHOW COLOURS FOR DRUGGISTS' SHOP WINDOWS.

BLUE.

No. 1.—Sulphate of copper ℥j, sulphuric acid ʒss, water ℥x.

No. 2.—Ammonio-sulphate of copper, ammonio-nitrate of nickel (see No. 5) and water.

No. 3.—Prussian blue gr. x., oxalic acid gr. xx., water ℥xvj.

No. 4.—Dissolve nickel in diluted sulphuric acid, add ammonia in excess, and dilute with water.

No. 5.—Dissolve nickel in diluted nitric acid, add ammonia in excess and dilute with water,

GREEN.

No. 1.—Sulphate of copper ℥ij, chloride of sodium ℥iv, water ℥xx.

No. 2.—Dissolve ℥j of nickel in ʒvj of nitric acid, and add Ov of water

No. 3.—Dissolve nickel in dilute sulphuric acid, and dilute with water.

No. 4.—Dissolve sulphate of copper in water, and add bichromate of potash until the required colour is produced.

No. 5.—Dissolve ammonio-sulphate of copper in water, and add bichromate of potash until the required colour is produced.

No. 6.—Dissolve sulphate of copper in water, and add nitric acid until the required colour is produced.

No. 7.—Dissolve distilled verdigris in acetic acid, and dilute it with water.

LILAC.

No. 1.—Dissolve zaffre (impure oxide of cobalt) in hydrochloric acid, filter, and add carbonate of ammonia in excess; to this add ammonio-sulphate of copper until the required colour is produced.

No. 2.—Dissolve zaffre in hydrochloric acid, filter, and add carbonate of ammonia in excess; to this add ammonio-nitrate of nickel (see *Blue*, No. 5) until the required tint is produced.

ORANGE.

No. 1.—Dissolve bichromate of potash in water until the required tint is produced.

No. 2.—The same as the last, but adding some oil of vitriol or hydrochloric acid.

PINK.

No. 1.—Dissolve ℥ij of zaffre in ℥vj of hydrochloric acid, filter, add solution of carbonate of ammonia in excess, then add f ℥j of liquor potassæ, and dilute with water, to produce the required colour.

No. 2.—Nitrate of cobalt may be used, with carbonate of ammonia, in the same way as the last.

PURPLE.

No. 1.—Sulphate of copper ℥j, carbonate of ammonia ℥jss, water Oijss.

No. 2.—The last colour, with a small quantity of the *Pink* No. 1.

RED.

No. 1.—Macerate powdered cochineal in spirit of hartshorn, and dilute it with water.

No. 2.—Dissolve carmine in solution of ammonia, and dilute it with water.

No. 3.—Wash the best madder two or three times with cold water, then macerate it in solution of carbonate of ammonia, filter the solution, and dilute it with water.

No. 4.—Dissolve madder lake in solution of carbonate of ammonia.

VIOLET.

Ammonio-sulphate of copper, diluted with water, and enough of the pink colour No. 1 to produce the required tint.

YELLOW.

Bichromate of potash ʒvj, carbonate of potash ʒiv, water ℥xvj.

THE LAGOONS OF TUSCANY.

The Tuscan Lagoons are, properly speaking, natural depressions of the soil ordinarily filled with water from which hot vapours are ejected. They are situated within a space of ten or twelve miles, lying between 28° 27′ and 28° 40′ of longitude, and between 43° 10′ and 43° 15′ of latitude. The principal lagoons are those of Monte Cerboli; of Castel Nuovo, in the valley of Cecina; those of Sasso, of Monte Rotondo, of the Lago del Edifizio, of Lustignano and of Serrazzano in the valley of Cornia. The ancients were acquainted with the Tuscan lagoons, and the name of Mount Cerberus accords well with the poetical and mythological ideas of the early people of Italy.

Even as late as the eighteenth century the lagoons were regarded only as a supernatural wonder, which excited astonishment rather than courted investigation. Under the Grand Duke Leopold I., the chemist Hœfer discovered, by analysis, that they contained boracic acid. This discovery, followed by further explorations, has bestowed upon the lagoons an unrivalled industrial importance, and has brought into the countries possessing them an activity contrasting strikingly with the miserable state in which they before languished. It is a curious fact in their history that before the discovery of this acid, the fœtid odour developed by the sulphuretted hydrogen gas—the certain death which met the man who fell into the scalding baths—the disruptions of the ground occasioned by the appearance of new *Soffioni*—and above all the superstitious terror with regard to them, had made the people consider the lagoons as a scourge from which they sought deliverance by public prayers; but now, if by any cause the *Fumacchi*, the source of common prosperity, should become extinguished, they would not fail to seek from heaven a restoration of this scourge, which, in the skilful hands of M. Larderel, has become, to quote M. Bowring, a source perhaps of greater riches than the mines of Peru or of Mexico, and certainly more reliable. After the discovery of Hœfer, Paul Mascagni, a noted chemist, had the first idea of procuring from the lagoons boracic acid like that of China, and of thus restoring to Europe the tribute that she had paid to Asia. But the attempt was not at first profitable, as the waters contain in solution, at the moment of their escape from the earth, only an insignificant quantity of boracic acid. Another chemist having observed that a part of the acid was thrown beyond the lagoon, by the violence of the vapours, and that it was scattered on the margins of the craters, and moreover being confident that the waters were capable of dissolving a greater quantity of acid, endeavoured to find means of saturating them, by constructing upon the declivities of the country artificial lakes fed by the streams from the mountain. The vapours which issue from these lakes keep their waters constantly at a boiling temperature. After impregnation for twenty or thirty hours by the vapours of the highest lake, they draw off the waters into the second lake to submit them to a new impregnation. From thence they are drawn into a third, and so on till they reach the receptacle at the lowest point. In their passage across six or eight lakes, they are charged with half per cent. of boracic acid. They are then led into the reservoir, from which they are conducted into lead reservoirs for evaporation, to produce concentration; and to hasten that operation, the happy idea was proposed of substituting for the combustibles sometimes used, and which were enormously expensive, the direct application of the heat of the Soffioni. This improvement decided the success of the enterprise. It is surprising that it was introduced at so late a day, since this method was not new, and had been long practised at the solfatara of Pozzuoli in extracting alum from the earth that contains it. In the lagoons, the hot vapours for carrying on the evaporation are taken at their origin, and carried across by lead pipes or by subterranean conduits below the boilers. Thus the fabrication is extremely simple, the locality itself furnishing the means of carrying it on. A single discharge of the vapours is sufficient to throw into ebullition, almost immediately, twenty or thirty caldrons, of a capacity of twenty barrels, which may be estimated at 84,000 pounds of liquid impregnated with boracic acid. Before allowing the vapours to escape, they direct them under the ovens in order to free the acid from its hygrometric moisture. Of late the somewhat complex system of boilers and coolers has been simplified by substituting rectangular tables of lead of twenty or thirty metres, divided at small intervals by transverse parallel divisions, but whose height is never raised above that of the edges. These tables have an inclination of two to three degrees. The water of the last lagoon is introduced upon the upper side in small quantities. The hot vapours for evaporating are conducted in such a manner that they act upon the lower surface. The liquid, after having filled the first compartment, is diffused very gradually into the second, then into the third, and so successively to the last, where it reaches such a state of concentration that it deposits the crystallized acid; the workmen remove it immediately by means of wooden scrapers. This mode of gradual concentration is very ingenious, and requires so few hands that it may almost be said that the acid is obtained without expense. From 1818 to 1845 the quantity of acid manufactured was 33,349,097 Tuscan pounds. From 1839 to 1845 the mean quantity has been two millions and a half of pounds.

Thus in estimating the product at 7500 pounds per day, the quantity of saturated water upon which they operate daily is 1,500,000 lbs. daily, and annually 547,500,000 lbs.

This labour brings to Tuscany twelve millions of pounds (ten millions of francs), and it is surprising that it should have remained unproductive during so many ages, and that it should have been reserved for the skill of M. Larderel, now Count of Monte Cerboli, and before 1818 a simple wandering merchant, entirely unacquainted with scientific researches, to discover the fugitive vapours and render them a source of inexhaustible wealth.

The violence with which the burning vapours escape gives rise to muddy explosions, when a lake has been drained by turning its waters into another lake. The mud is then thrown out, as solid matters are ejected from volcanos, and there forms in the bottom of the lake a crowd of those little cones of eruption whose activity and play reçall exactly under another form the *hornitos* of Malpays. Their temperature varies from 120° to 145° Centigrade, and the clouds which they form above the lagoons constitute true natural barometers, whose greater or less density rarely disappoints the predictions that they announce.

While in an industrial point of view, the lagoons occupy the first rank among the natural products of Tuscany, they place new resources at the disposition of science, permitting the investigation of various geological phenomena, even under the direction of the will of the experimenter. The metamorphic gypsum which we have seen produced at Pereta under the influence of sulphuretted hydrogen vapours, is formed at the lagoons, which, like those of Monte Cerboli, and of Castel Nuovo, are made to cross argillaceous limestone beds, and with such abundance that their formation may be fully tested. Action also takes place at the same time upon the walls of fractures and the fissures of the soil, which open a passage to the subterranean vapours. Thence it extends gradually into the interior of the masses, and it ends by gypsifying whole circles, whose radius is generally that of the lagoons themselves. Pure limestones are converted into a lamellar sulphate of lime, but of a loose texture, and free of cellules. This structure is probably due to the expansion they undergo from the addition of new materials, and perhaps also by the passage of the gas at the moment of the crystallization of the salt. The calcareous formations below the argillaceous, preserve after their transformation their primitive position, and they present an alternation of gypseous beds, and of argillaceous beds, which the acid has freed from the soluble bases. When this influence is exerted in the direction of the thickness of the strata, it is very common to see towards the limits where the metamorphic influence ceases, a mass of rock strikingly calcareous at one of its extremities, terminating at the other extremity in a gypsum which the inhabitants use for buildings. The resemblance to the gypsum beds, occurring in the midst of the secondary formations, is exhibited even in the reddish tint with which oxidation marks the associate clays of the alberèse. But a peculiarity which has given me the solution of a problem which had embarrassed me thus far, deserves mention; for we have reproduced here certain phenomena of which the enormous deposits of the Provençal Alps present many examples. I had noticed at Roquevaire and at Digne, irregular argillaceous incrustations, in which are found entangled, without order, angular fragments of sulphate of lime of various sizes. In admitting the transformation of the jurassic limestone of these countries posterior to its consolidation under the influence of the acid vapours, it was difficult to explain the mode of formation of these breccias, and the manner in which these fragments were introduced. In all these cases they seemed to indicate an overflow of waters, but the theory opposes the intervention of waters for the accomplishment of the facts relative to the conversion of the limestone, or it leaves in doubt the part which they must have acted. But, observe what is apparent at the lagoons of Monte Cerboli and of Castel Nuovo. At the same time that the limestone is changed into gypsum, by the contact of sulphurous agents, the fragments of alberèse which waters had brought down from heights above, to the midst of the miry and boiling lakes, are thus changed into sulphate of lime, and constitute, with the clays in which they sink, brecciated argillo-gypseous beds without stratification. That this fact should be equally apparent in the ancient beds under analogous circumstances, is at least what might be inferred from the examination of that which passes in the lagoons. We should also observe the analogous positions of the *boracite* of Luneburg, which is found in crystals disseminated in gypsum intercalated in the midst of a cretaceous bed, and the boracic acid and borates of the Tuscan lagoons.

These different facts well confirmed, establish in my view an intimate resemblance between the gypsum of the lagoons, and the abnormal gypsum beds of secondary regions.

If the silicification of the macigno which we have noticed in the neighbourhood of the solfatara of Pereta should appear an exaggerated application of the theory brought forward, the verification of it may be traced in the lagoons of Sasso, where the solution of the silex of the freestone and its redisposition are manifest in all places where circumstances allow of this double transformation. The Fumacci of Sasso rise to the south of the establishments, from beneath a vast mantle of fine-grained freestone, over which passes the mountain road connecting the valley of the Cornia with the province of Sienna. At intervals the road is interrupted by isolated boiling pools or shallow cavities, which exert a metamorphic action upon the regions which they traverse. The first evidence of alteration is apparent in the colour of the rock, which from blackish-grey becomes white. It is cracked in all directions. The vapours follow quickly these lines of separation, attack the silica of the macigno, dissolving it out, and immediately depositing it under a gelatinous form. The gelatinous mass becomes opake in the air, and assumes the resin-like appearance peculiar to hydrated silica. In connexion with this we observe imbedded in a siliceous cement, nuclei of a white micaceous sandstone, unaltered at the centre, causing a breccia appearance. This kind of breccia is finally, by the complete solution of the nuclei, converted into a greyish rock entirely siliceous, which resounds under the hammer like clink-stone, and resembles exactly by its aspect and its roughness of touch, porcelain biscuit. Sometimes the solution is more rapid, and then the rock is formed of an agglutination of little grains analogous to those of an ancient quartz rock, and possessing its tenacity and hardness. Examined with a glass, each grain is composed of an independent particle or driblet of hydrated silica, and they seem to have collected as viscous tears, such as would have adhered together in hardening. Breislak observed at the solfatara of Pozzuoli fragments of decomposed lava bound together by a siliceous substance almost vitreous; but in the lagoon of Sasso the solution and permanent regeneration of silica, effected at the expense of the macigno, are carried on upon a vast scale and over a space of great extent.—*Bull. Soc. Géol. de France*, Dec., 1848, 147; and Silliman's *American Journal of Science* for May, 1850.

PATENT VENTILATING STOVES.

Among the objects of interest exhibited at the Conversazione of the Pharmaceutical Society last May, was a ventilating stove by Mr. Pierce. In a foot note appended to the notice of this stove, we stated that Mr. Cundy claimed priority of invention, having taken out a patent founded on the same principle.

We have received from Mr. Pierce a copy of a certificate from Dr. Ure and Mr. Hunt, in which the distinction between the two stoves is pointed out, and a preference is given to that of Mr. Pierce. Mr. Cundy on the other hand maintains that the principle of construction which he had patented has been pirated, with a trifling alteration in the design, which he considers a defect.

Understanding that the question at issue is not unlikely to be tested before a legal tribunal, and wishing to remain unprejudiced until it is decided, we avoid enlarging further on the subject at present.

THE EPIDEMIOLOGICAL SOCIETY.

A Society is in process of formation, the object of which is to investigate epidemic diseases; to trace, as far as may be found practicable, their proximate causes, and by this means to ascertain what human agency or forethought is most calculated to arrest the progress, or mitigate the violence, of these visitations. The proposal to form the Society emanated from Mr. Tucker during the summer of last year, when the prevalence of the cholera, and the conflicting opinions of medical men, as to the proper mode of treatment, suggested to his mind the idea that the subject, in connexion with epidemics in general, was involved in so much doubt and uncertainty, that it deserved the special consideration of the profession.

The proposal has met with a warm response from many of the leading members of the profession, and it has been determined to establish the Society. Dr. Babington has been elected President, and a Provisional Council is appointed. The first general meeting of the members is announced to be held on Tuesday, the 30th, by which time the present number of this Journal will be printed. We are, therefore, unable to publish the result until next month.

NOTICE OF A MEDICAL BILL.

HOUSE OF COMMONS, JULY 23.

Mr. Wyld, in moving for leave to bring in a Bill to incorporate the General Practitioners of Surgery, Medicine, and Midwifery, said, It would not be necessary for him to detain the House more than a few moments, as he was happy to state that he had obtained the assent of the Home Secretary to the introduction of his Bill. The object of his motion was to incorporate the General Practitioners, and to give them the power to institute examinations into the qualifications of those who wished to pursue the general practice of the medical profession. He merely proposed to lay the Bill upon the table, as he did not intend to take any action upon it during the present session of Parliament.

Colonel Thompson seconded the motion, which was agreed to, and leave was given to bring in the Bill.

NOTICE OF THE LIFE AND DISCOVERIES OF GAY-LUSSAC.

"Gay-Lussac is quick, ingenious, lively, and profound, with great activity of mind and great facility of manipulation. I should place him at the head of the living chemists of France."—Sir H. Davy.

Nicholas François Gay-Lussac was born at St. Leonard, in the department of Haute-Vienne, on the 6th December, 1778. Few men have led such a life of scientific industry as the subject of this memoir. There is scarcely a branch of physical or chemical science to which he has not contributed some important discovery. The eminent qualities which were destined in after years to shine with so much lustre revealed themselves at an early age in Gay-Lussac. At the close of the last century, Berthollet having been appointed Professor of Chemistry at the Polytechnic School, looked around amongst his pupils, and selected four of them to be assistants in his laboratory. Fortunately for Gay-Lussac he was one of the four selected; and Berthollet communicated to him his ideas on a subject of great importance, and traced out before him the course of research he wished him to follow in its investigation. The young assistant, highly delighted with the prospect of experimentally confirming the views of his great master, applied himself with diligence and assiduity to the task; but alas! experiment only served to demonstrate the incorrectness of the Professor's theory. Was Berthollet displeased with the result? By no means; but said to his pupil, "Your destiny, young man, is to enlarge the domain of science;" and wishing to retain him as his assistant in the laboratory, obtained permission from the authorities that Gay-Lussac, who then stood as senior pupil of the *ponts et chaussées*, and, therefore, liable to be called immediately into active service in the army, should be exempt for two years, and yet receive his salary. This was the starting point of Gay-Lussac's illustrious career. The sagacity of the author of *Statistic Chemistry*, discovered in the pupil of the *ponts et chaussées* the author of discoveries destined to immortalize his name; and this presentiment of Berthollet will not astonish any one who knows the great importance of the alliance of mathematical with chemical knowledge in the successful pursuit of chemistry. Berthollet knew that Gay-Lussac possessed these combined qualifications in an eminent degree, and that to rectitude of judgment he united that spirit of candour which produces love of truth. At the close of the last century the course of instruction in natural philosophy was very elementary, it had not yet acquired that importance which MM. Biot and Gay-Lussac afterwards imparted to it. Their philosophic method of teaching this science—their spirit of analysis—their ingenious, delicate, and correct means of investigation—had not then been introduced, and consequently the study of the experimental sciences was very deficient; but when this method and these means were put in practice by Gay-Lussac, and example joined to precept, then the solution of questions submitted to investigation became at once easy and precise.

In the year 1804, the celebrated Chaptal, then Minister of the Interior, conceived the idea of an äerial ascent for furthering acquaintance with physical phenomena, and MM. Biot and Gay-Lussac having spontaneously offered themselves for the service, the war balloon which had been employed by the French army in Egypt was entrusted to them, and refitted at the public expense under their direction. MM. Biot and Gay-Lussac ascended from the Conservatoire des Arts on the 24th of August, 1804; but as the principal object of this ascent was to ascertain whether the magnetic power experienced any appreciable diminution as we ascend from the terrestrial surface, we proceed to notice the second ascent made by Gay-Lussac alone on the 15th of September, 1804, from the same place as before. In addition to various magnetic and hygrometric observations of great interest, Gay-Lussac filled two air flasks with atmospheric air, the one at the height of 21,460 feet from the surface of the earth, and the other at 21,790 feet. As soon as he reached Paris after his descent (which took place about 16 miles N. W. of Rouen, or upwards of 70 miles from the place of ascent) he hastened to the laboratory of the Polytechnic School, and proceeded to analyze the air he had brought from the upper regions, in the presence of Thènard and Gresset. When opened under water, the fluid rushed into the vessels, and apparently half filled their capacity. The air was found, by very delicate analysis, to contain exactly the same proportions of oxygen and nitrogen as that collected near the surface of the earth. The greatest height reached by Gay-Lussac on this occasion was about $4\frac{4}{11}$ English miles, where the barometer indicated only 12.95 inches.

In 1808, Gay-Lussac discovered the laws of the combination of gaseous bodies, and thus furnished a practical demonstration of the correctness of the atomic theory promulgated by Dalton in the previous year. The development of these laws, now termed the laws of Gay-Lussac, have contributed to throw a new light on pneumatic chemistry, which has been reflected into all the mysterious departments of animal and vegetable chemistry. We now know that all gaseous bodies combine with one another in simple ratios of their volume, and that the substances formed by such combination are composed of definite proportions of their constituent gases.

In 1813 Gay-Lussac commenced his investigations of iodine, and in 1814 published his valuable treatise on this subject. In 1813 Sir H. Davy (who was at Paris by the special permission of the Emperor Napoleon) also investigated the properties of this new body. The merit of first discovering the peculiar properties of this substance, and of assigning it a place in chemical nomenclature, has been claimed both by Gay-Lussac and by Davy. As our space is limited, we will give as condensed an account as possible of the question at issue. Iodine was discovered in the year 1810 by Courtois, who gave some specimens of it to M. Clement for his examination. M. Courtois noticed some of its properties, and M. Clement ascertained others; but neither of them determined its real nature. On the arrival of Davy at Paris, he was introduced, amongst other eminent chemists, to M. Clement, who considered that he could not better testify his respect for the talents of the distinguished foreigner than by showing him a specimen of the then unknown body (iodine) which as yet he had shown only to MM. Chaptal and Ampère—another account states it was through Ampère that Davy received the iodine. When Davy received the precious *morçeau*, he at once set to work, and "determined that it was a new body, and that it afforded a peculiar acid by combination with hydrogen, and not a compound affording muriatic acid, as Clement thought, and *this I mentioned to M. Gay-Lussac*, Ampère, and other Chemists." When Gay-Lussac heard that some of this unknown body had been furnished to Davy he obtained some of it, and on the 6th of December, 1813, read a paper at the Institute, respecting which he states, in his *Memoir on Iodine*, published August, 1814, that "the results which it contained have determined the nature of iodine, and that I have established that this substance is a simple body analogous to chlorine. Up to the present time no one has contested the point that I was the first to make known the nature of iodine, and it is certain that M. Davy did not publish his results until more than eight days after he was acquainted with mine." Davy says that "Gay-Lussac published, without acknowledgment, what he had first learned from me." On the 13th of December, 1813, Davy communicated his researches on iodine to the Institute, in a letter dated the 11th of that month; and on the 20th of January, 1814, a paper by Davy, of the date of December 10, 1813, was read before the

Royal Society of London. Davy further states that "M. Gay-Lussac held and maintained the opinion that the hydriodic acid obtained from the new substance was muriatic acid, when I first stated to him my belief that it was a new and peculiar acid, and that iodine was a substance analogous in its chemical relations to chlorine." There can be no doubt but that the first suggestions, as to the real nature of iodine, proceeded from Davy, and that had not Davy examined this substance, its nature might have remained for many years undetermined. In a letter contained in the *Journal of Science and Art*, for 1817, Davy says, "Through the kindness of MM. Ampère and Clement, I had made some experiments on iodine before M. Gay-Lussac had seen this substance, and assisted by my theory of the combinations of chlorine, I immediately formed the conclusion now generally adopted respecting its nature. I have never wished to arrogate to myself any merit in the history of the researches made respecting a discovery belonging to another country, and I take this opportunity of assuring M. Gay-Lussac, that the note which called forth the animadversions to which I replied, was more painful to me thanit could have been to him. The merits of that school of chemistry of which he is so distinguished an ornament, require no vindication. They are felt by the Chemists of the present times, and they will convey its glory to remote posterity."

On the 18th of September, 1815, Gay-Lussac published his important researches on prussic acid, in which he demonstrated the existence of a body to which he gave the name *cyanogen* (the producer of blue, so called from its forming a constituent of Prussian blue) and which, although itself a compound substance formed of carbon and nitrogen, yet, in all its combinations with other substances, plays the part of a simple body. The discovery and investigation of cyanogen reflects the highest honour on Gay-Lussac. On the first announcement of this discovery, Sir H. Davy made some objections, but in a subsequent communication to the *Journal of Science*, vol. i., 1816, he thus writes, "In the last article, I have defended some opinions of my own, and combated those of M. Gay-Lussac. In this article, the object I propose is much more agreeable to my feelings— to offer my experimental confirmation of the very elaborate and ingenious researches of M. Gay-Lussac on the prussic acid and the prussic base."

Chlorometry, or the method of determining with precision the quantity of chlorine contained in a given sample of chloride of lime, was also made the subject of careful investigation by Gay-Lussac, and his researches have proved of great value. The first method proposed by him was that of ascertaining the real value in chlorine of the substance under examination, by the quantity of a determinate solution of indigo in sulphuric acid, which was decolourized by the addition of a certain weight of chloride. The second method subsequently proposed by Gay-Lussac, is founded on the principle of raising a metallic substance from a lower to a higher state of oxidizement. For this purpose, a standard solution of the chloride to be tried is slowly poured from a graduated glass tube upon a determinate quantity of arsenious acid, dissolved in muriatic acid, until the whole of the arsenious acid be converted into arsenic acid. The value of the chloride is greater in proportion to the less quantity required to produce this effect.

On the 15th of December, 1842, Gay-Lussac took out a patent in this country, through Mr. Sautter, for improvements in the manufacture of sulphuric acid. The object of the invention is, such an arrangement of apparatus, that the nitrous acid gas (which in a well regulated sulphuric acid chamber should be always slightly redundant) which previously had been allowed to pass from the leaden chamber into the atmosphere and become lost, may be retained and used over again in the manufacture of sulphuric acid, and thus render the quantity of nitrate of soda or potash employed for manufacturing a given quantity of sulphuric acid, much less than that previously required.

To effect this, the nitrous acid gas is brought into contact with a current of sulphurous acid gas from a sulphur furnace, and with a jet of steam, and the deutoxide of nitrogen thus formed is transmitted to the large acid chamber, where it plays its part in the usual round of operations. The economy thus effected has been estimated at one-third that of the nitrate of soda or potash usually employed.

We next come to notice the great improvements introduced by Gay-Lussac into the process of silver assay, or the mode of determining the quantity of pure silver contained in any given quantity of alloy. This improvement consists in the substitution of the humid process of assay for the old process of cupellation. The French silversmiths having complained of the inaccuracy of the public assays made at the Mint of Paris and elsewhere, the commission of the Paris Mint appointed M. D'Arcet to investigate the subject, who soon found that the complaints of the silversmiths were well founded. He found that an ingot experimentally composed of 900 thousandths of fine silver and 100 thousandths of copper, appears by cupellation to be only at the most 897 or 896 thousandths; whereas fine silver of 1000 thousandths comes out nearly of its real standard. Consequently a director of the Mint, who should compound his alloy with fine silver, would be obliged to employ 903 or 904 thousandths, in order that by the assay in the laboratory of the Mint, it should appear to have the standard of 900 thousandths. These three or four thousandths would be lost to him, since they would be disguised by the mode of assay adopted. The humid process recommended by Gay-Lussac is founded on the well-known property which silver has, when dissolved in nitric acid, to be precipitated in the state of an insoluble chloride of silver on the addition of a solution of either common sea-salt (chloride of sodium) or muriatic acid; the weight of the chloride of silver thus formed shows the weight of pure silver contained in the alloy. As however it would be somewhat tedious and uncertain to ascertain the precise weight of the chloride on account of the difficulty of drying it, an exact account is taken of the quantity of a solution of salt of a determinate strength which is required to precipitate the whole of the silver from the nitric acid solution. For this purpose a standard solution of salt in water is prepared in such proportions, that 1000 measures shall completely precipitate, say twelve grains of silver, perfectly pure, or of the standard 1000, previously dissolved in nitric acid. The solution thus prepared, gives immediately the true standard of any alloy whatever of silver and copper, by the quantity of it which may be necessary to precipitate the silver contained in twelve grains of this alloy. If, for example, 905 measures have been required to precipitate the silver contained in the nitric acid solution of twelve grains of this alloy, its standard would be 905 thousandths.

This process is at once simple, delicate, and of easy manipulation, and possesses many advantages over the process of cupellation. Gay-Lussac published a small treatise on the subject, descriptive of the various forms of apparatus, &c., best adapted for the successful working of the process, and containing also useful tables of correction for variations in the temperature of the standard solution of salt employed.

With regard to Gay-Lussac's interesting researches on hygrometry, and the attempt made to connect the indications of an instrument with the tensions of vapour at different temperatures, and thence to deduce all the hygrometric conditions of the air, we need only state that the relative results exhibited by all instruments of this kind, however convenient they may be for some meteorological purposes where a rigid and philosophical accuracy is not required, are by no means to be compared with those *absolute* results which an attention to the conditions of temperature and barometrical pressure afford.

There is, perhaps, no discovery of Gay-Lussac's which is brought into more general and every-day use in France and some other countries than his alcohol-meter, or *alcomètre centesimal*, which has superseded all other instruments in France for indicating the quantity of real alcohol contained in any admixtures of spirit with water. This instrument is formed like a common glass hydrometer, and its scale is divided into 100 degrees, each of which denotes one centime, or a per cent. of alcohol. The zero is at the bottom of the scale, and corresponds to pure water, and the division 100 at the top of the scale denotes pure alcohol.

If this instrument, when immersed in a mixture of alcohol and water, sinks to the division on the scale of 50, it denotes that the mixture is composed of fifty parts of alcohol and fifty of water, and so on with mixtures of every proportion of water and spirit. This instrument is graduated to the temperature of 15° C. = 59° Fahr., and in order to obtain correct results, the liquor to be tried must be of that temperature; but as it would be often troublesome and inconvenient to bring the spirit under trial to the exact temperature of 59°, Gay-Lussac constructed an elaborate set of tables, in which the corrections of the instrument are given through a range of temperatures from 32° to 86° Fahr.

In conjunction with M. Thènard, Gay-Lussac investigated the nature of the chlorine compounds, and of the metals which form the basis of the alkalies; these eminent chemists were the first to effect the complete separation of fixed organic substances into their elements. By his experiments on mercury and elastic fluids, Gay-Lussac ascertained that whatever may be the nature of the fluid, it dilates equally from the temperature of ice to that of boiling water, and that it acquires an increase in volume of one-third.

In conjunction with M. Humboldt, he likewise made a series of observations on the theory of M. Biot, who from data supplied by Perouse, endeavoured to determine the position of the magnetical equator, and its intersection with the terrestrial equator. The result of the inquiry is, that the great chains of mountains and even volcanos have no perceptible influence on the magnetic power, and that that power diminishes in proportion to the distance from the terrestrial equator. The precipitation of metallic oxides one by another; the chemical action of light; the nature and constitution of wood-spirit and its compounds, were amongst the many subjects ably treated by Gay-Lussac. The last paper read by him at the Academy of Sciences was on *Aqua Regia*, on the 12th of June, 1848.

Gay-Lussac died at his residence in the Jardin des Plantes, on the 9th of May last. He successively occupied the chairs of Natural Philosophy at the Faculty of Sciences; of Chemistry at the Polytechnic School; at the College of France, and at the Museum; he was a Member of the Committee of Management of the Government manufactories of gunpowder, saltpetre, and tobacco; Comptroller of the Mint; Editor of the *Annales de Chimie et de Physique*; and Consulting Chemist to the extensive manufactory of sulphuric acid, soda, chloride of lime, &c., at Chauny, and the Plate Glass works at St. Gobain. The salaries of his public appointments amounted to 68,300 francs (£2732) per annum. Gay-Lussac was elected deputy by his department after 1830, and was subsequently nominated by Louis-Philippe a peer of France.

Gay-Lussac was elected a member of the Institute in the year 1806, at the early age of twenty-seven; and there are few societies in France or elsewhere of which he was not a member. He enriched the *Annales de Chimie et de Physique* with many valuable contributions, many of which have been reprinted, and edited jointly with M. Thènard a work on the chemical researches in which they were connected.

The remains of Gay-Lussac were interred at the cemetery of Mont-Parnasse, on the 11th of May, and funeral orations were pronounced over the tomb by Arago, Becquerel, Chevroul, Pouillet, Thènard, and Despretz.

NOTICES OF BOOKS

A Practical Treatise on Diseases affecting the Skin. By the late Dr. A. T. Thomson, M.D., F.L.S., &c. Completed and edited by Edmund A. Parkes, M.D., &c. 8vo, pp. 440. London: Longmans.

About 300 pages of this work were printed, and some other portions ready for press, at the time of the decease of our late valued Professor, who had devoted much attention to the subject for more than thirty years. Dr. Parkes, who was intimately acquainted with the author's opinions and medical treatment, has completed the work. It is prefaced with a very interesting Memoir of Dr. Thomson. The subject being a medical one, a review of the work would be out of place in these pages; but the respect due to the author as one of our late Professors in the School of Pharmacy, claims the brief notice we have given.

Dr. Howe's Second Report on Training and Teaching Idiots. Addressed to the Governor of the Commonwealth of Massachusets. Perkins Institution and Massachusets Asylum for the Blind. 8vo, pp. 72. Boston: Feb. 1850.

The Eighteenth Annual Report of the Trustees of the Perkins Institution and Massachusets Asylum for the Blind. 8vo, pp. 94.

Elements of Urinary Analysis and Diagnosis; *being Directions for a Chemico-Pathological Examination of the Urine and Urinary Concretions, &c.* By Robert Venables, A.M., M.B. Small 8vo, pp. 66. Second Edition. Written expressly to accompany the Urino-Chemical Chest, containing the Instruments and Tests necessary for such Examinations arranged, &c. London: G. Knight and Sons, Foster Lane.

A Practical Hand-Book of Medical Chemistry. By John E. Bowman, Demonstrator of Chemistry in King's College, London. John Churchill, Princes Street, Soho.

This little work is intended to afford to the Medical Practitioner and also the Student an explanation of the chemical and microscopic examination of the organs and secretions of the animal body with a view to the determination of their healthy or diseased state, together with instructions for the detection of poisons in organic mixtures and in the tissues. It contains as much information on these subjects as the Medical Man who makes the examination himself, or the Chemist, to whom it might be referred, would require, including all the results of modern investigations. It appears to have been very carefully prepared, and is well illustrated with wood-cuts. We have seen no work of the kind that we could more confidently recommend.

Physician and Patient; *or a Practical View of the Mutual Duties, Relations, and Interests of the Medical Profession and the Community.* From the Text of William Hooker, M.D. Edited by Edward Bentley, M.D., &c. &c. Small 8vo, pp. 303. London: Richard Bentley, New Burlington Street.

Pharmacopœia Nosocomii Regii Glasguensis. Scuptore R. Macgregor, M.D. Glasgow: Printed by John Graham, 181, Trongate.

The Commercial Hand-Book of Chemical Analysis. By A. Normandy. London: G. Knight and Sons, Foster Lane.

The Chrono-Thermalist, Nos. 1 to 5.

TO CORRESPONDENTS.

J. F. (Derby).—(1.) The strength of liquor opii sedativus was formerly considered three or four times that of laudanum. Probably this impression arose from its action being more sedative. It is now generally prescribed in nearly, if not quite, as large doses as laudanum.—(2.) We are not acquainted with any work on oil paints and colours.

Alpha, M.P.S.—It would occupy two or three pages to answer the question fully. There are some practical points connected with it on which we require further information. The answer is therefore deferred.

B.P.W. (Brompton).—The stains of nitrate of silver may be removed by means of cyanide of potassium.

T. W.—Solutio Solventis Mineralis. Vol. viii., page 395.

A Country Druggist.—It is unlawful to sell drugs to brewers knowing or suspecting that they are to be used in making beer (42 Geo. III., c. 20; 51 Geo. III., c. 87).—(2.) We are not aware what oil is alluded to under the name of "French oil."—(3.) Nut oil is generally free from unpleasant odour—"as sweet as a nut" is a proverb. When rancid we can suggest no remedy.

Amator Scientiæ has again omitted his address, otherwise we should have answered by post.

An Apprentice (Brighton.)—If our correspondent will communicate his name, we shall be glad to offer a few suggestions, and to promote the object he has in view.

C. F. G.—The subject has repeatedly been considered, and efforts have been made to attain the object, but without effect.

Lavatus.—The use of private formulæ in medical practice has been alluded to by several correspondents, and we shall offer some remarks on the subject next month. We should be glad to communicate with our correspondent if he would give his address.

Amor Scientia (Wellington).—(1.) In determining the extent of solubility of cream of tartar, the salt should be mixed with boiling water. It requires more than sixty parts of water for its solution when cold.—(2.) The internode is the longitudinal space, which, if it exist, renders the leaves alternate, but with opposite leaves it is absent as regards those leaves.—(3.) The cause is not different from that which causes the deposition of water at any other time.—(4.) Yes.

R. S. P.—We have no recollection of such a statement in this Journal. Iron would be objectionable for such a purpose.

Spes.—(1.) We presume the compound, the formula for which is ($Sn\,Cl_2, + NH_3, H\,Cl$) is meant. It is made by directly combining the two salts.—(2.) By heating together powdered tin and iodine.—(3.) See any book on Chemistry.

Chemicus.—Lacquer is a solution of shellac and other resins in spirit, coloured with gamboge, dragon's blood, or saffron.

J. P.—The prescriber should be consulted.

Mr. Teaze.—The specimen sent is the plant commonly called Yarrow—*Achillea millefolium.* It is reputed to be tonic and vulnerary; it is sometimes added to beer to render it more intoxicating, and is used by smokers in place of tobacco. Dr. Stokes, of Dublin, has recommended it in dropsies.

Advertisements to Mr. Churchill, Princes Street, Soho.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Other Communications to the Editor, 338, Oxford Street, before the 20th of the month (if Answers be desired in the ensuing number).

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. III.—SEPTEMBER 1st, 1850.

THE EXHIBITION OF THE WORKS OF INDUSTRY OF ALL NATIONS.

The preparations for this exhibition are rapidly progressing to completion, and those who intend to become exhibitors should lose no time in securing the space they are likely to require. For this purpose notice must be sent before the end of October to the respective local secretaries, who will, on application, furnish printed forms to be filled up by exhibitors, as follows:

"*No.* *Form.*
"This Return is to be filled up by intending Exhibitors, and addressed to Hon. Secretary to the Local Committee for the Town of

Name.	Address.	Nature of Manufacture.	Area required in superficial feet.			Average Height likely to be required.	Remarks.
			Floor.	Table or Counter.	Wall.		

With a counterpart to be retained by the intending exhibitor.

It is necessary that this return should be in the hands of the Commissioners before the end of October, to enable them to make the needful arrangements for the reception of the specimens which are to be sent in on or after the First of January, 1851, until the First of March, inclusive, after which day no further goods will be received. General instructions respecting the arrangements of the Committees, the description of articles admissible, and their classification, may be found in a pamphlet, stitched into our number for April, 1850 (Vol. ix., No. 10).

On reference to the lists of raw materials, animal, vegetable, and mineral products, chemical substances used in medicine, including chemical and pharmaceutical preparations, it will be seen that there is a wide field in which the manufacturing and pharmaceutical Chemists will have an opportunity of evincing their skill, ingenuity, and experience.

These lists are only intended to furnish examples of the description of materials and products which are admissible. Under each head, miscellaneous articles may be comprised, possessing novelty, superiority, peculiarity in the process of manufacture, economy, or other qualification, entitling them to notice.

The exhibitor must, in every instance, state in what character he exhibits—whether as designer, inventor, producer, manufacturer, or proprietor. No exhibitor will be allowed to sail under false colours. Where the merit of an article consists in the skill and experience displayed in the preparation, the ingenuity of the invention, or the originality in the adaptation, credit must be given to the person or persons to whom credit is due.

For example, collections of specimens purchased from different manufacturers for the purpose of exhibition, would not be admissible in the name of the exhibitors. If this were permitted, each manufacturer would be competing with himself through the medium of those whom he had supplied with specimens, while the manufacturers themselves would be driven out of the field by delicacy towards their customers. In some instances, where a product or article of manufacture has passed through several hands, each of whom has assisted in the production, it will be necessary to consider what share of the merit belongs respectively to each, and this will be settled by juries appointed as referees in each special department. The above is the only just and equitable principle which could be adopted in an Exhibition of this kind.

In consequence of a misunderstanding respecting this principle, arising, we presume, from the want of sufficient assistance from practical men in the first instance, some of the retailers of Birmingham goods have threatened to close their accounts if the manufacturers with whom they transact business enter into competition with them. A similar difficulty has arisen with the carpet manufacturers, and in other branches of trade; and many of the leading manufacturers have withheld their co-operation, considering the Exhibition *as originally proposed*, to be merely a trade advertisement, and calculated rather to promote quackery than to encourage and reward real merit. It is much to be desired that those who entertain these views, in which we fully concur, will, on further reflection, lend their assistance, and by throwing their influence into the scale, promote those principles and arrangements which practical experience would suggest as being calculated to lead to a satisfactory result.

The Commissioners having had the subject under their serious consideration, will endeavour to prevent future doubt and misunderstanding, by issuing specific regulations more clearly defining the principle to be acted upon.

Up to the present time but little indication of activity has been manifested in the Chemical and Pharmaceutical department in this country, and we have reason to believe that this arises in some instances from objections against the expediency of the proposed Exhibition, on the ground that it is likely to give rise to feelings of jealousy between exhibitors, and dissatisfaction among those who are not in a position to take a part in the Exhibition. We trust the result will prove these fears to be groundless. At all events it is too late now to discuss the principle of expediency. That question is decided, and the Exhibition is to take place. It now remains for the British Chemists and Pharmaceutists to decide, whether they will come forward and take their right position in an honourable trial of skill with foreigners who are already in the field, and preparing for the competition.

Systematic arrangements are in a forward state on the Continent, commissions are appointed and pamphlets are in circulation, calling upon the Chemists and Pharmaciens, as well as all classes of the community, to add their efforts to the general movement, and sustain the national character. In a pamphlet lately issued in Paris by M. Charles

Dupin, and officially circulated, we find the following paragraph:— "We appeal to the Chemical Arts, brought in France to such perfection for the preparations, more numerous every day, of oxides and acids, alkalies and salts, which are supplied to every nation by the commerce of France, here we may exhibit productions remarkable for their invention, improvement in the mode of preparation, and diminution of price." Many articles are enumerated which are exported from France to Great Britain, in some of which the former nation claims originality and pre-eminence.

British Chemists need not shrink from competition with their rivals in any quarter of the globe, and ought not to allow the present opportunity to pass without sustaining their scientific and commercial reputation.

On such an occasion, minor considerations and jealousy among ourselves should merge in the general determination to excel. The rivalry should not be considered so much a competition between one British Chemist and another, but between British Chemists and those of other nations. Great Britain has thrown down the gauntlet and challenged the world; the challenge has been accepted, and we must abide by the result.

COLLUSION BETWEEN MEDICAL MEN AND CHEMISTS.

STENOGRAPHIC PRESCRIPTIONS.

"At a late meeting of the Pennsylvania State Medical Society, among the resolutions offered, was the following: 'Whereas, it is asserted, and confidently believed, that it is the practice of some physicians and apothecaries to enter into a collusive arrangement by which the former are to receive a per centage upon all prescriptions sent to the latter, and in this way bring dishonour upon the medical profession: therefore *resolved*, That this Society regards all collusion between physicians and apothecaries, whether with a view to pecuniary profit or patronage, as opposed to every principle of that moral code which the profession have adopted, and that no physician, known to be guilty of such a collusion, should be entitled to the confidence and professional intercourse of medical men.'"*

In this country, as well as in America, it is a violation of medical etiquette and respectability for a physician to participate directly or indirectly in the profit arising out of the dispensing of his prescriptions. It would be a libel to accuse either a medical man of receiving, or a Chemist of paying, a share of the spoil as an equivalent for patronage. Yet it is rumoured that such things are done, and it is generally believed that the rumour is not unfounded. There is no statute law to prevent such an arrangement; but there is this contradiction attending it, that while honour forbids the practice, each party seems to consider it a point of honour (of another kind) not to betray the other. Consequently, such collusion may possibly exist without being suspected, or it may be supposed to exist—but proof is wanting.

The necessity for this secrecy is easily explained. A physician, by the regulations of his College, is prohibited from engaging directly or indirectly in the sale of medicines. By so doing, he is liable to expulsion, and loss of rank as a physician. A pure surgeon stands on similar ground. This collusion is a deception on the public. A physician or prescribing surgeon receives his usual fee, or he prescribes gratis, taking credit for benevolence. When he takes his per centage—in the first case he is paid twice over; in the second case, he receives money for that which he has already given away. He professes to practise as a physician or surgeon, as the case may be, while in fact he is practising as an apothecary. He has a direct interest in drenching his patients with medicine, and prescribing it in the most expensive form, although he must be aware that they consult him in the full belief that he is disinterested in this respect. They give him the "honorarium" in preference to paying an Apothecaries' bill, and he betrays their confidence by grasping both.

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* Quoted from an American paper by the *Dublin Medical Press* of July 31.

If a medical man, whether physician or surgeon, think proper to embark in general practice, there is a straightforward course before him. He may take a shop or surgery, change his position in the profession, and become an apothecary. His patients then know what to expect. They know that his charges for medicine include remuneration for advice. But a man who professes only to prescribe, and clandestinely takes a profit on the medicine, is deceiving his patients, and robbing the druggist. If the fact were known, his character would sink far below that of the honest apothecary, whose position he affects to despise. The deception on the patient is two-fold, for he is strictly charged to go to one particular chemist, on the ground that no other is to be depended on; whereas, the actual reason is, because the party recommended is the accomplice or the assistant, and the prescriber is a participator in the profit, if not the proprietor of the shop. The statement that no other chemist can be depended on, may, in one sense, be perfectly true, if stenographic prescriptions be written, which only the accomplice can decipher.

A chemist who is thus implicated would be ashamed to own the fact, and if this be the case, how much more culpable is the medical man. The chemist is only recognised by law as a tradesman, he has not yet been placed in his proper professional position. The medical practitioner is a member of an enlightened profession—he has a high character to sustain—he is the confidential adviser of his patients. By accepting a per centage, he places himself on a par with the butler of a nobleman who takes a bribe from his master's tradesmen, with this distinction, that while the butler is satisfied with five per cent., the medical man requires, as we have been informed, forty or fifty.* How this amount of bribe is to be made up without fleecing the patient or starving the druggist, is a question, the solution of which we shall not attempt.

We are convinced that no respectable member of the medical profession is guilty of this degrading practice, but in all classes of society there are shades of character ranging from white to black.

The object of these collusions might often be frustrated by patients going to the wrong shop, the remedy for which casualty consists in the employment of stenographic prescriptions, intelligible only to the accomplice. This precaution is not always sufficient, as patients occasionally, either by accident or from prejudice in favour of some other Chemist, transgress orders. When this occurs, the Chemist to whom the prescription is brought, is obliged to confess his inability to prepare it without seeing the prescriber, and even when he has taken this trouble he cannot always depend on receiving correct information. A slight variation in the formula given may alter the appearance of the medicine, which difference the patient naturally attributes to a mistake on the part of the dispenser, and is, therefore, induced to go in future to "the only Chemist who can be depended on."

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* In the Report of the Board of Health, on Extramural Sepulture, the evidence of a witness contains this assertion, "It is known that Surgeons take commission on funerals."

When the author of a stenographic prescription refuses to disclose its composition, or equivocates, and appears to be much annoyed at the inquiry, there are strong grounds for suspicion that a collusion exists.

There are some cases, however, in which prescriptions of this kind may be used without any such motive, and these cases ought to be pointed out in order to place the question in its true light.

In hospitals and dispensaries, certain compounds are kept in store for daily use, the formulæ for which are registered in small pamphlets, called Pharmacopœias. These being compiled by the medical officers of the several institutions, are adapted to their respective habits of prescribing, and each contains special formulæ, according to the judgment and experience of the authors. When these formulæ find their way to a chemist's shop (which is sometimes the case) the dispenser is at fault, and his only resource is to apply at the institution for a copy of the Pharmacopœia.

Medical practitioners who dispense their own medicines, usually adopt a similar plan, finding it convenient to keep in readiness certain compounds which they frequently prescribe. These prescriptions are written in terms understood by the assistant or apprentice; they are intended exclusively for his guidance, and seldom pass into other hands. Others, who practise avowedly as Apothecaries, have their medicines prepared by Chemists with whom they keep regular accounts, and who act in the same manner as assistants.

When a medical practitioner, who does not keep a shop or dispensary, wishes to introduce a new preparation, or to try the effect of a compound prepared in a particular manner, he avails himself of the services of a neighbouring chemist, who acts under the instructions given. While the trial of the preparation is going on, and before the result is sufficiently conclusive to make the publication of the formula desirable, a stenographic prescription is used for convenience, and the patient is informed where the medicine is to be obtained.

Some patients, especially those who are nervous or hypochondriacal, thwart the intentions of their medical advisers, by tampering with prescriptions, and acting on their own judgment in violation of orders. In these cases, it may be conducive to the welfare of the patient to prevent this interference by means of stenographic prescriptions. Such cases, however, are rare exceptions to the general rule. During the intervals between the several revisions of the Pharmacopœia, the progress of science leads to the introduction of a variety of improved processes and new medicines, each of which has a more or less limited notoriety, until it has stood the test of experience, and is found worthy of publication. By way of illustration we may mention a few examples:—Battley's liquor opii sed.; Dr. A. T. Thomson's syrupus ferri iodidi; Mr. Copland's pilula aloes diluta; Donovan's liquor iodidi arsenici et hydrarg.; Solutio solventis mineralis of Apothecaries' Hall, &c. We have also Dover's powder, Hoffman's ether, Huxham's tincture of bark, Fowler's solution, Scheele's hydrocyanic acid, and many other preparations which were at one time either proprietary or prescribed stenographically, but which have emerged from the "chrysalis state," and acquired an officinal character. Other medicines might be enumerated, which have not yet become fully developed, that is to say, they are known only as the proprietary preparations of the original makers, and in this character are sometimes ordered in prescriptions. In France, all secret medicines are prohibited. They cannot legally be sold to the public, or prescribed by the profession. In England the law does not interfere, and the custom varies according to circumstances, or the choice of the parties concerned. Some publish their formulæ, and obtain their reward in professional credit, others prefer ready money, and retain the exclusive manufacture.

With regard to the use of stenographic prescriptions by medical men in private practice, it is obvious that if the system were carried to any great extent, it would occasion endless confusion. If it were the custom for each medical man to have a set of private formulæ, it would be necessary for prescribers and dispensers to run in couples. A few exceptional cases may be admissible; but, as a general rule, every prescription should be generally intelligible, and new formulæ, when their character is established as medicines regularly prescribed by the profession, should be published. Until this is done, the name of the maker should always be inserted in the prescription, in order that any Chemist may know where to obtain the preparation.

If the revision of the Pharmacopœia occurred more frequently, such stenographic prescriptions would more speedily become vernacular. The improvement which is taking place in the education of Pharmaceutical Chemists, has already to a great extent removed one inducement to stenography in prescriptions. In this respect we may consider education a "free trade" movement, as it has a tendency to extend the confidence of the profession, which was formerly limited within a more narrow compass.

HOMŒOPATHY.

The patronage of homœopathy by some members of the aristocracy has been commented upon in most of the medical journals, and the Hon. Member for Finsbury lately took occasion to advert to the subject in the House of Commons. He stated his belief that "a more audacious set of quacks did not exist and could not be found on the surface of the globe, than were to be found in the Homœopathic Institution. It consisted partly of noodles and partly of knaves. The noodles formed the majority, and the knaves used them as tools; and if they could contrive to get into their hands some amiable noble lord, and to stick him up as President, they advertised their Association over the world, and then, as it unfortunately happens in such cases, too many dupes were found to become the victims of their abominable designs."

There may be much truth in the above assertion, yet we doubt whether anathemas of this kind are so well calculated as dispassionate argument to convince the judgment. A man who is publicly denounced as a dupe, is not generally disposed to plead guilty and recant. His organ of combativeness is roused into action, while causality is quiescent. He is drawn into a controversy, by which means he is converted from a passive tool into a strong partisan. Persecution is the ladder on which quacks rise; it is the oxygen which supports their existence.

If we analyse the system and trace it to its origin, we find that homœopathy is a reaction consequent upon the drenching system practised by the old apothecaries. The custom of remunerating medical men in proportion to the quantity of medicine furnished by them, led, in times that are past, to an abuse, the antithesis of homœopathy, but no less flagrant. The stomach of every patient was converted into a laboratory, into which heterogeneous compounds were perseveringly introduced for the benefit of the prescriber, the quantity depending on the capacity—not of the stomach—but of the purse.

The aristocracy, who could best afford to pay—or, in other words, to swallow—were most severely drenched, and now they are retaliating on the profession by patronising a system of quackery, the secret of which consists in avoiding medicine, and quieting the mind of the patient with sugar-plums.

The drenching system, as it was formerly practised, was a positive evil; it has been to a great extent rectified by the partial separation of medical practice and pharmacy. It might be entirely removed by carrying the remedy still further.

The homœopathic system is an evil rather negative than positive. It is an evil which will cure itself by the occasional intervention of the Coroner. During the process of cure, a few Lords may, probably, be sacrificed, that is, allowed to die for want of medical treatment, and this will produce a reaction in the other direction. In this manner the two extremes will merge, and the public will discover the truth of the maxim,

In medio tutissimus ibis.

THE NEW MEDICAL BILL,

For incorporating the General Practitioners of Medicine, Surgery, Midwifery (and Pharmacy).

This Bill being now printed, we cannot pass it over in silence; but shall condense our notice into the smallest possible compass. The proposed incorporation is to be called the "Royal College of General Practitioners in Medicine, Surgery, and Midwifery." It comprises the usual elements of a corporate body—President, Council, and other officers (including Examiners) and Members. The age of the Members is to be not less than twenty-two, to which a period of fifteen years' practice is added to constitute the qualification for the Council. Provision is made for the admission of qualified Practitioners already in practice on liberal terms, and for the expulsion of Members guilty of misconduct. Powers are given to Members to recover payment for advice *and medicine*. The penalty clauses are rather confused and require revision. No reservation or exception is made in favour of Chemists and Druggists.

If the Bill should be carried, the new college will extinguish Apothecaries Hall, emasculate the Colleges of Physicians and Surgeons, *atrophize* all other Colleges and Universities in the United Kingdom, and stand forth as the National Polytechnic Emporium of Medicine, Surgery, Midwifery, and Pharmacy.

The result of the issue of balloting papers by the Editor of the *Lancet*, placed in juxtaposition with this Bill, shows rather a singular coincidence. It is as follows:—

"In favour of amending the charter of the Royal College of Surgeons on the principle of representation, 2266; in favour of incorporating the General Practitioners in a distinct college, 414."

While these balloting papers were *in transitu*, a similar inquiry was in progress on the part of the National Institute of General Practitioners, which resulted in the above Bill for incorporating the General Practitioners in a new college.

From this it appears that the Editor of the *Lancet* and the National Institute have arrived at results diametrically opposite, and that the advocates of the proposed Bill will be neutralized by Mr. Wakley's majority.

The game is still going on; a further supply of balloting papers has been issued in the *Lancet* since the publication of the above return, for the purpose of obtaining, if possible, the sense of the entire profession. This appears to us to be a work of supererogation, for, we conceive, that the sense of the profession on the subject is already either expressed or understood.

VERDICT AGAINST A CHEMIST AND DRUGGIST FOR PRACTISING AS AN APOTHECARY.

On the 8th of August a trial took place in the County Court, at Wymondham, Norfolk, in which the Apothecaries' Company prosecuted William Skoulding, a Chemist and Druggist, for practising as an Apothecary without having obtained from the Company, a certificate of qualification. No defence was set up, and, by consent of Skoulding's solicitor, judgment was immediately given for a penalty of twenty pounds.—*Lancet*, Aug 24.

This is the only notice we have seen of the case. Not knowing the particulars, we insert the above by way of caution, as it is not improbable that other prosecutions will follow. It is difficult to draw the line with precision between the practice of an Apothecary and the functions of a Chemist and Druggist, recognised prior to the year 1815, consequently we advise our brethren to be on their guard, and if the prosecutors should in any case commit themselves by sailing too near the wind, we should be glad to be immediately informed.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

In the List of Members last Month, under the head *Major-Examinations*, the name of John Marshall was accidentally omitted.

RECEIPTS AND EXPENDITURE IN LABORATORY FOR 1849-50.

RECEIPTS.	£	s.	d.	EXPENDITURE.	£	s.	d.
Fees from 28 Pupils	529	14	6	Drugs and Chemicals, including Petty Cash Expenditure..................	98	7	6½
				Apparatus, Glass, and Gas Fittings	45	9	10½
				Paper	5	9	11
				Fuel............................	14	10	6
				Repairs, &c.	8	10	10
					172	8	8
				New Boiler and Fittings to Furnace	81	13	6
				Balance paid to Secretary...	60	15	4
				Professor's moiety of Fees, out of which he pays for assistance, £55	264	17	0
	£529	14	6		£529	14	6

W. Ince.

July 26*th*, 1850. George Waugh.

There are a few other charges fairly connected with the Laboratory, but they are so interwoven with the general expense of the Society, that they cannot be separated.

THE LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, August 12*th*, 1850.

THE PRESIDENT IN THE CHAIR.

Dr. Brett delivered a lecture on "Antidotes," and premised that the term *antidote* could only be fairly applied to a substance, capable, when administered, of chemically combining with the poison imbibed, and producing a compound either innocuous or inert.

Substances, therefore, that act physiologically upon the system, and thus counteract or modify the effect of poisons, and those that by mechanical action prevent their rapid absorption, must be regarded as remedial agents rather than true antidotes. As a general rule, the effect of an antidote is to render the poison insoluble, the compound thus formed being inert; but it must not be supposed that any substance capable of producing an insoluble compound with the poison, is necessarily an antidote to that poison, as many substances insoluble in water are found to possess highly poisonous properties, calomel, ammonio-chloride of mercury, carbonate of lead, and sulphuret of arsenic, are substances of this class. In choosing an antidote, it is, therefore, necessary to have experimental evidence whether the compound produced by its combination with the poison is harmless, irrespective of its solubility in water.

Corrosive poisons are generally capable of complete neutralization by alkalies or earths, and the compound, whether soluble or insoluble, is harmless. Thus, sulphuric acid may be neutralized with potash, lime, or magnesia, each sulphate being innocuous. Of these the best antidote is calcined magnesia; oxalic acid, on the other hand, although neutralized by an alkali, is equally poisonous, and it is, therefore, necessary to employ lime as an antidote, or some earth capable of forming an insoluble compound with this acid. Alkaline poisons require the same caution; generally neutralization by a weak acid is efficient, but if, as in the case of baryta, its soluble salts are equally poisonous, it is necessary to employ an acid capable of rendering it insoluble, as sulphuric acid. A misappreciation of the above precaution has caused the introduction of many antidotes which are worthless, and therefore dangerous. For instance, sulphuret of potassium has been proposed as an antidote for arsenic, on the ground of its producing an insoluble sulphuret of arsenic; but Orfila has proved that pure sulphuret of arsenic is a deadly poison, therefore the danger is only increased by the delay. Many so-called antidotes, as in this case, are themselves poisons, and their value can alone depend on the proper proportion being administered, which practically is unknown, and hence all such should be considered dangerous; oxalic acid recommended in lead poisonings is an example. Many antidotes had been named for arsenic, but none deserved the name—the action of animal charcoal, albumen, and magnesia could only be mechanical, and carbon, which had been highly spoken of, was found incapable of removing $\frac{1}{80}$th part of its weight of arsenic from solution in water. The advantage of the use of hydrated oxide of iron was equally doubtful. Drs. Brett and Taylor had found that ten parts of iron failed to remove the whole of one part of arsenic from solution, and thirty parts administered to an animal only modified the effects of this poison. In the cases of arsenical poisoning, where three or four drachms are usually taken, it would require three or four pounds of the oxide, presuming the arsenic were in a state of perfect solution, otherwise it is not probable any benefit could result from its use.

Apart from chemical laws, we must observe physiological effects in the recommendation of antidotes, and such information can only accrue by experience. In all cases of corrosive poisoning speedy neutralization is the first object; in but few other cases have we any valued antidotes, and the stomach pump and emetics must be our first, and remedial agency our last resource.

ISINGLASS AND ITS ADULTERATION.

Mr. H. **Sugden Evans** read a paper on Isinglass, in which he gave a history of the introduction of this substance, described the sources from which it is principally derived, the mode of preparing it for use, and the manner in which it has been recently adulterated. The subject was illustrated by reference to specimens.

In describing the preparation of the isinglass, Mr. Evans gave the following account of the process adopted in Russia, which he said he had received from one of the largest importers of the article in London:—

"The bladder of the fish is cut open and carefully washed in cold water, nailed against a board and exposed to the sun to dry. Before it is quite dry the film (the silvery tissue) is peeled off. In the winter the bladders, as taken from the fish, are buried in the snow without washing them, and when the spring sets in and the weather is sufficiently warm to admit of their being dried in the sun, they are treated as above described. They are occasionally dried before a fire, and in this case a clear liquid sometimes exudes, which hardens into what is called *drop isinglass*; but this mode of drying is not considered so good as that in the open air. When dried in the sun there is a glutinous discharge, which being removed by the finger and thumb, forms the kind of isinglass known by the name of *kroski*, which signifies a crumb."

The isinglass, after being imported into this country, is submitted to further processes to fit it for use. It is picked and cleansed, rolled into thin sheets, and cut by machinery into fine shreds. In describing those processes Mr. Evans alluded to the adulteration which has been recently practised, and which he said consists either in rolling sheets of isinglass and gelatine together, or in dipping the isinglass into a solution of gelatine before rolling and cutting it. Specimens of the adulterated isinglass were shown, which, he stated, fully verified the description given by Mr. Redwood, excepting that in these specimens he had not been able to detect the presence of the gelatine by the use of the microscope. He read an extract of a letter from Mr. Vickers, in which that gentleman states, that the parties accused of adulterating their isinglass with gelatine had some time ago threatened to bring an action against him as the originator of the charge; and that so far from fearing it he had offered, and was still willing to pay, £50 and the expenses of the trial, if they would take legal proceedings, by which he might be enabled to substantiate the charge in a court of law.

ORIGINAL AND EXTRACTED ARTICLES.

MITCHAM: ITS PHYSIC GARDENERS AND MEDICINAL PLANTS.

More than 2000 years ago the physicians of Greece were supplied with herbs, of which their Materia Medica chiefly consisted, by a class of persons called ῥιζοτόμοι (*rhizotomi* or *root-cutters*), who occupied themselves with the collection and sale of roots and herbs. They are mentioned by Theophrastus[*] in connexion with the φαρμακοπῶλαι (*pharmacopolæ* or *pharmacopolists*). Most of them were illiterate and superstitious, and ascribed magical virtues to the roots and herbs which they collected.

Among the Romans these cullers of simples were termed *herbarii* (*herbarists*), and, if we are to believe Pliny,[†] they were a sad set of knaves.

At the present day, and in our own country, the ῥιζοτόμοι of the Greeks and the *herbarii* of the Romans, are represented by a class of persons called *simplers*, who go about the country collecting those medicinal herbs which grow wild, and the demand for which is insufficient to induce the dealers to cultivate them. The plants thus collected are sold chiefly to the *herbalists*, by whom the profession and public are supplied.

But those medicinal plants for which there is a sufficient demand, and which can be grown in this country, are cultivated in *physic gardens* or *physic grounds*, by persons called *physic gardeners* or *herb growers*.

Although the cultivation of medicinal plants is carried on in various parts of England, yet more land is employed in this way in

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[*] *Hist. Plantarum*, lib. ix., cap. ix.

[†] *Nat. Hist.*, lib. xxi., cap. lxxxiii., ed. Valp.

Surrey than in any other county; and by far the greatest part of our physic grounds lie in the parish of Mitcham, and its neighbourhood, about nine miles from London. The soil of this place is a rich black mould.

The cultivation of physical plants at Mitcham commenced about a century ago. Lyson,[‡] who wrote in 1796, says, that forty years before his time there were only a few acres employed in the cultivation of medicinal herbs in this parish; whereas, at the time he wrote, about 250 acres (of which 100 acres were devoted to the cultivation of peppermint) were occupied by physic gardeners.

At the present time more than 800 acres are devoted to the cultivation of medicinal herbs, at Mitcham, Merton, and Carshalton.

About 1768 or 1769, Mr. Potter began the cultivation of physic plants at Mitcham. He was succeeded by his relative, Mr. James Moore, who furnished Mr. Malcolm[§] with the information contained in his work relating to the medicinal plants cultivated at Mitcham.

The following are the names of the principal growers at the present time, with the number of acres of land each person has under cultivation, and the number of stills in use.

Growers' Names.	*No. of Acres.*	*No. of Stills.*
Mr. Moore	350	5
" Arthur	300	3
" Martin	40	3 (not much used).
" Newman	40	1
" Sprules	50	2
" Weston	40	0
	820	14

Several other growers cultivate a few acres of land.

A considerable number of medicinal plants are cultivated at Mitcham. Among the most important of these may be mentioned *aconite, chamomiles, belladonna, elaterium, liquorice, henbane, lavender, spearmint, peppermint, roses, poppies, savine, violets, angelica, stinking orache, caraway, foxglove, lovage, elecampane, marshmallow, and hemlock.* The principal part of the growers cultivate only peppermint and lavender, and some a few chamomiles. Mr. Arthur grows rather a larger number of plants than any other.

We propose occasionally to notice a few of the more interesting of the physical herbs cultivated at Mitcham, beginning with chamomiles and lavender.

I. CHAMOMILES.

1. *Varieties.*—There are two well-known sorts or varieties of the officinal chamomile (*Anthemis nobilis*, Linn.) cultivated at Mitcham: one called the *single chamomile (chamomelum flore simplici)*, the other termed the *double chamomile* (*chamomelum flore pleno* vel *flore multiplici*).

In the normal or original state, the flower, which is a composite one, has one row of white female ligulate florets, encircling a disc of yellow hermaphrodite tubular florets; and this state the flower is said to be *single*. But the yellow hermaphrodite tubular florets have a strong tendency to become converted into the white female ligulate ones. Now, when only a few of the yellow florets have undergone this change, the flowers are still called *single*; but when all or most of them have suffered this conversion, they are then termed *double flowers*. It is obvious, therefore, that the terms "single" and "double" are, to a certain extent, arbitrary. Flowers with a single ring of ligulate florets are certainly single, while those which have no tubular florets are decidedly double. But between these extremes there are all gradations.

[‡] *Environs of London*, vol. i.; *County of Surrey*, p. 350. 1796.

[§] *Compendium of Modern Husbandry*, vol. iii., p. 116. 1805.

The change is irregular, and occurs to a greater or less extent in the same plant. At the commencement of the season a few flowers, single or nearly so, are found on plants, which, at a later period of the year, yield only double flowers. The result apparently depends in part upon the mode of cultivation, which is conducted habitually without reference to this particular object, and in part, probably, on other less obvious influences.

It is generally stated that the single flowers are more odoriferous, and yield a larger proportion of volatile oil.

Lewis observes of chamomiles, that "As their active matter is almost wholly confined to the yellow disc, and as the single have large discs, but the double very small ones, and when very double scarcely any at all; it is plain that the latter cannot be equivalent to the former, unless taken in much greater quantity; and, therefore, the single or large-disced flowers alone ought to be employed for medicinal uses."

The double flowers, however, are much more showy, and hence are preferred by the public; double flowers being usually more admired in floriculture than single ones. Hence, therefore, in Chemists' and Druggists' shops the double sort is usually found; whereas at Apothecaries' Hall the single sort is exclusively purchased and sold.

We find it stated by Malcolm in 1805, and by Stevenson in 1809, that the single sort is almost exclusively sold to Apothecaries' Hall, while the double sort finds a ready sale at the Chemists' and physic shops.

On inquiry, we find that the Apothecaries' Company still exclusively keep the single sort, believing it to be the one intended by the College of Physicians. The Company purchase it of Mr. Moore.

It is very desirable to ascertain by direct experiment the actual quantity of oil yielded by single and double flowers respectively; and we should be glad to receive from any of our readers the results of their experience on this point. Mr. Brande states, that 100lbs. of dried flowers yield, upon an average, two pounds twelve ounces of oil, and three pounds four ounces of *pharmaceutical extract*. We presume this is the experience of the operators at the Hall, where single flowers only are employed.

At Mitcham two kinds of double chamomiles are distinguished, one yielding the ordinary yellowish oil, the other, which is called the new sort, a blue oil. The samples of each kind, which have been furnished us by Mr. Arthur, of Mitcham, by whom they are cultivated, are not distinguishable, except from a slight difference in the leaf, which in the new sort is more developed. The oil is generally distilled from the entire plant, not from the flowers only, as directed in the Pharmacopœia. By keeping, this blue oil[¶] changes its colour, and becomes the usual yellowish or brownish yellow colour. The flowers which yield it, although fine in appearance when fresh, are liable to change colour by keeping. They are therefore less adapted for sale in the market than they are for distillation.

[¶] The *oleum chamomillæ* of continental writers is blue, and is sometimes termed *oleum chamomillæ cæruleum*. It is the produce of *Matricaria Chamomilla*, Linn.

The *oleum chamomillæ romanæ* of the same writers, is the produce of *Anthemis nobilis*, Linn.

2. *Cultivation.*—Stevenson says that "The soil best adapted for chamomile is a dry sandy loam: the sets are planted about nine inches from each other, on beds four feet wide, with alleys of eighteen inches between them. The culture is very similar to that of peppermint; viz. constant attention to weeding, principally with the hand; the digging of the intervals at the beginning of winter, and covering the exposed and loose roots of the plants with fresh mould."

Mr. Arthur informs us that chamomiles may be cultivated from seed, which plan is adopted for the introduction of a fresh variety from another locality, or by way of occasionally renewing the stock. But the plan commercially pursued is that of dividing the roots, each root forming the rudiments of three or four dozen plants. Mr. Arthur plants them in rows a yard apart, with an interval of about eighteen inches between the plants. If planted closer, the space is not sufficient for gathering the crops without treading on the plants. At the close of the season, a sufficient number of plants are preserved to furnish the roots for the ensuing season, and the remainder are destroyed.

March is the best month for planting; but they are sometimes planted in April, and occasionally in the autumn.

The crop is in perfection about July, and continues to yield more or less until September, and sometimes as late as October. The period, however, varies according to the season.

Either extreme of wet or dry weather is injurious to chamomiles. A soaking shower about once a week, with intervals of sunshine, is the most favourable weather.

Mr. Arthur states that chamomiles are most productive when grown in rather a heavy soil. A stiffish black loam suits them better than a light sandy soil, which latter causes them to become weak, or than clay, which is too heavy. They are benefited by changing the ground every two or three years. They require but little manure. If over-manured, they run to stem and leaf, and the crop of flowers is less abundant.

When gathered, the flowers are placed on canvass trays in a drying closet, warmed by means of a cockle. They remain there about a day, which time is generally found sufficient.

The average crop per acre is six cwt., but the range is from three to ten cwt. The single flowers are by weight more productive than the double; but the price being lower, the value of the crop is about the same.

The flowers supplied to the English market are grown chiefly at Mitcham and in Derbyshire. Both kinds are of good quality, but we think a preference is generally given to Mitcham flowers.

The gathering costs from three farthings to one penny per pound. The cost of gathering and drying chamomiles is about 42*s.* per cwt.

The London market is chiefly supplied with chamomiles from Mitcham. The following, according to Mr. Squire,* are the quantities supplied to the principal dealers in London:

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* *Pharmaceutical Journal*, vol. v., p. 356.

From Mitcham.		*From other places in the vicinity of London.*	*Total.*
Average of three years, 1840-41-42.	Average of three years, 1843-44-45.	Average of three years, 1843-44-45.	Average of three years, 1843-44-45.
12 tons.	4 tons.	16 cwt.	4 tons 16 cwt.

II. LAVENDER.

One species of Lavender only is cultivated at Mitcham, namely, common or garden lavender, the *Lavendula vera.* D. C. The spike lavender, *Lavendula spica*, D. C., is not cultivated there.

Lavender is cultivated by dividing the roots, each of which forms the rudiments of three or four new plants. These are planted in rows about 18 inches apart, with the same interval between the plants. The second year, each alternate plant is removed to leave room for those which remain. It is common to renew the plantation after the second year; but Mr. Arthur, who has given much attention to this subject at Mitcham, has succeeded in preserving the same plantation during five or six years.

Lavender is liable to a disease when too thickly planted. This occurs chiefly in the middle of the plantation, and appears to result from the aroma of the flowers, which in excess has a poisonous influence on the plants. By thinning the plantation, and ensuring a free current of air, this influence is prevented or retarded. The disease is rarely if ever met with in gardens, where single plants are cultivated. Lavender does not require a very rich soil.

A good deal of oil of lavender is drawn at Mitcham. The capacity of the stills varies from 700 to 1000 gallons. The lavender packed in bundles called *mats* (about 1 *cwt.* each) is carried to the still-house. A 1000 gallon still holds from twenty to twenty-four mats of lavender. The mat or covering of the bundles is not put into the still with the herb.

The flowers are put into the still with the stalks as cut from the ground. It takes about two hours to get the steam up; then the finest oil is drawn for two and a half hours—that which comes afterwards is second or third quality. The oil from the stalks is not so volatile as the other, and comes last.

ON HYRACEUM,
A PROPOSED SUBSTITUTE FOR CASTOREUM.

BY JONATHAN PEREIRA, M.D., F.R.S.

I HAVE recently received from my friends, Messrs. August Faber and Co., of London, a small sample of this substance, with a note, stating that it was a new article, intended as a substitute for castoreum in medicine. They inform me that they believe all that has been imported into Europe as yet, is a dozen tins of about one pound and a half each, which were sent from the Cape of Good Hope (the place of production) to Hamburgh, and there sold at about eight shillings each. The tins were of a cylindrical shape, and the hyraceum contained in each was in one mass, adhering to the tin without any other protection.

As this substance is a very remarkable one, and is scarcely known even by name in this country, a short notice of it, and of the animal which yields it, may not be uninteresting to the readers of the Pharmaceutical Journal.

The name *hyraceum* was first applied to this substance by Dr. Edward Martiny, in 1847 (*Naturgeschichte der für die Heilkunde wichtigen Thiere*, p. 119). It is derived from *Hyrax*[*] (the generic name of the animal yielding this substance), and bears the same relation to this latter word that castoreum does to castor. By the Dutch colonists, this substance had been erroneously called *Dassen-piss* under the mistaken notion that it was the urine of the *Dasse* (the name by which the animal is known at the Cape).

The animals referred by zoologists to the genus *Hyrax*, and called by French zoologists *Damans*, possess remarkable interest to the naturalist, on account of the importance of anatomy to the accurate determination of their position in a natural classification. For a long period they were placed among the *Rodentia*, to which in size and general appearance, they bear some resemblance. But Cuvier showed that by their organization, they really belong to the *Pachydermata*, being, with the exception of the horn, little else than rhinoceroses in miniature; at least, they have quite similar molars, but the upper jaw has two stout incisors, curved downwards, and, during youth, two very small canines, the inferior four incisors, without any canines. The dental formula of the genus, therefore, is as follows:—incisors $\frac{2}{4}$, canines 0, molars $\frac{7}{7} - \frac{7}{7} = 34$. The animals have four toes to each of their fore-feet, and three to the hind feet, all, excepting the innermost posterior, which is armed with a crooked and oblique nail, terminated by a kind of very small, thin, and rounded hoof. The body is covered with thick hair, and beset here and there with erinaceous bristles. They have a simple tubercle in place of a tail, short muzzle and ears, and six teats, two pectoral and four ventral.

The *Hyrax capensis*, Cuvier, the *Cavia capensis* of Pallas, and some other writers, was considered by Cuvier to be identical with the *Hyrax*

Hyrax capensis.

(From a specimen in the British Museum.)

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[*] The word "hyrax" is derived from ὕραξ, which Nicander (*Alexipharmaca*, 87) uses to signify the shrew-mouse,

Syriacus—the *Coney* of Scripture (*Levit.* ch. xi., ver. 5; *Psalms*, ch. ciii., ver. 18). It is about the size of a large rabbit; with soft hairs, greyish or ashy-brown above and paler beneath. Along the back is a dark band or stripe, with a blackish spot in the middle. The head is thicker, and the mandible or lower jaw higher than in other species. Vertebræ from forty-eight to fifty. Ribs twenty-one to twenty-two. Space between the incisor and molar teeth small. Interparietal bone large and three-angled.

Hyraceum, such as I have received it, is a tolerably hard solid substance, which breaks with considerable difficulty; and has a blackish brown colour, a glistening or resinous appearance in places, which have a somewhat glutinous feel. It has a moderately strong odour, which greatly resembles that of Canadian castoreum. In taste also, it is like the latter substance. When heated in the flame of a candle, it evolves a castor-like odour, swells up, burns, and leaves behind a spongy coal, with a whitish ash on the apex. From the yellow colour which it communicates to the outer cone of the flame, it manifestly contains sodium or soda, and from the intense white light which the ash on the apex of the coal evolves, it obviously contains lime. Water dissolves a considerable portion of it. Boiled in alcohol, it communicates a feeble colour to this liquid. By boiling in water, it evolved a smell similar to that of castoreum, and yielded a decoction which was of a dark yellowish brown colour, and very feebly restored the blue colour of reddened litmus paper. When submitted to dry distillation in a test tube, it evolved, first, an odour of castoreum, then a dense white empyreumatic smoke, which communicated a blue colour to reddened litmus paper, thereby indicating the presence of ammonia.

Hyraceum has been submitted to a careful microscopic examination by myself as well as by my friends Dr. Sharpey and Mr. John Quekett. Vegetable tissues, (epidermis, cellular tissues, woody fibre, ducts and spiral vessels), animal hairs, and siliceous sand have been found in it. Mr. John Quekett observes that "spirit and caustic potash appear to have little or no action on it; but they bring out a few epithelium scales, principally of the scaly variety." I could detect no blood discs. Dr. Sharpey also observes that he "saw nothing which could for a moment be taken for blood particles or the remnants of blood particles." He observed globular particles, perhaps, either resinous or oily; and at least two kinds of vegetable epidermis, one apparently from a gramineous plant. The animal hairs were short fragments, very fine, and by no means numerous.

The physiological nature of hyraceum is not well ascertained.

Thunberg (*Travels in Europe, Asia, and Africa, between the years* 1770 *and* 1779, vol. i., p. 165) alludes to the popular notion at the Cape that these animals menstruate. "In the crevices of the mountains, a great number of *dasses* (*Cavia capensis*) were found, which were generally supposed to have the menstrual flux." In another passage (vol. i., p. 166) he says, he "was shown a kind of bitumen, which the country people were pleased to call *dasses p*——, supposing it to be the inspissated urine of the great mountain rat (*Cavia capensis*) that is found there. I was informed," he adds, "that this bitumen was to be found in great abundance in the cracks and crevices of the mountain, especially at one large projecting *krants* or summit."

Sparrman (*Voyage to the Cape of Good Hope*, vol. i., p. 309, 1786) notices the animals which the natives call *dasses* or *badgers*. "These creatures," he observes, "which have some affinity with the ordinary marmots, and are about the same size, are eaten by many people, who look on them as a delicacy. They are likewise easily made tame, and are found in many other places in the African mountains. The little *Dassen islands* on the western coast of Africa, take their name from them. On these places in the mountains where these creatures dwell, there is found a substance, called here, *dassen piss*. It resembles petroleum, or rock oil, and by many that have seen it, is actually considered as such. It is likewise used by some people for medical purposes, and by them is supposed to have greater powers than is consistent with any degree of probability. Finding that this substance did not stand the same proofs as petroleum, and at the same time that it was found only in places frequented by the *dasses*, I had sufficient reason to conclude that it proceeded from this animal, and that it is most probably the menstrual excretion of the creature, as observations made on a tame female of this species have given room for such a suspicion; and as besides the dass's excrements are often found in this substance, and seldom anywhere else."

Professor Lichtenstein informed Schrader that "this substance is found in small separate pieces on rugged mountainous declivities, chiefly in those districts where the *Hyrax capensis* is most frequently found. The colonists collect these pieces, which, when fresh, are soft and somewhat glutinous, and press them together into larger masses, in which state the volatile constituents are better preserved. They employ it medicinally, either in the form of powder, or infused in wine, in many diseases, especially in hysterical complaints, in which it frequently acts in a surprisingly beneficial manner."

"The Hottentots," says Buffon (*Histoire Naturelle*, Suppt., t. vi., p. 280, 1782), "highly prize a kind of medicine, which the Dutch call *badger's urine* (*pissat de blaireau*). It is a black dry substance, which has a very bad smell, and is found in the crevices of the rocks, and in caverns. They say it is derived from the urine of these animals, who always pass it in the same spot. The urine deposits this substance, which, becoming dry by time, acquires some consistency. This," adds Buffon, "is very probable; for the animal at Amsterdam almost always passed his water in the same corner of the cage in which he was confined."

In the published accounts of the dissections of this animal no glandular structure, such as we must suppose would be required for the secretion of hyraceum, is mentioned. Mr. Quekett writes to me that having examined a portion of the specimen which I gave him, he believes it "to be composed entirely of excrement, and not like castoreum and musk the secretion of a gland; for I find," he adds, "that the hyrax capensis has no anal or other glands." But it deserves to be especially noticed that dissections of *male* animals only have been published; while the remark of Sparrman would lead us to suspect that the secretion is peculiar to the female. Further observations respecting the anatomical structure of the animal are required ere we can arrive at any satisfactory conclusion respecting the origin of hyraceum. My friend, Mr. Thomas Bell, Sec. R.S., who some years since had in his possession a living full grown male animal (the one which was subsequently dissected by Professor Owen), tells me that his specimen had no peculiar smell, nor did he observe any peculiar gland on examination after death.

Pallas (*Spicilegia Zoologica*, tom. i., fasc. ii., p. 16, 1767) notices as unusual and anomalous in the structure of the animal, the mode of insertion of the uretus into the fundus of the bladder. Professor Owen (*Proceedings of the Zoological Society*, 1832) notices, and somewhat corrects this description. For what purpose this structure is designed in the hyrax, or whether the urine undergoes any change in consequence of it, Mr. Owen could not conjecture, but he alluded to the alleged medicinal qualities of this secretion.

Sparrman's opinion receives no support from the physical and chemical examination of the specimen in my possession.

Dr. Krauss, of Stuttgart, who resided for a long time at the Cape, says, that most of the colonists regard it as a secretion which appears with the catamenia.

Dr. Edward Martiny (*op. ante cit.*) who reports this, adds, "that its occurrence at the rutting season gives great weight to this opinion. I regard hyraceum," he continues, "as a secretion connected with the sexual functions, and produced by highly developed preputial and probably also vaginal glands, as in the beaver, but with this difference, that while in the beaver we know not whether this secretion is at times evacuated, in the hyrax it is very probably actually excreted. For we find it in considerable quantities in those places where the animals are met with ; a fact explained by the circumstances that the animals at the Cape usually live in herds. Dr. Krauss writes to me, that it is especially found in the fissures of the variegated sandstone of many mountains in the colony, especially in Kokmansklof and Franche Hoek, and may be collected there in extraordinary quantity. In proof of this, it may be mentioned, that some years ago, Professor Pöppig, of Leipzig, received from the Cape some bird-skins, stuffed with hyraceum to preserve them. So that it must be met with in considerable quantity, and at a low price, and might, therefore, be obtained as an excellent substitute for the more costly castoreum."

As the hyraceum which I have received contains vegetable remains, and probably, therefore, is contaminated with the excrement of the animal, I was anxious to know what kind of fæcal matter is discharged from the bowels. Pallas says that the "scybala in ultimo intestino erant moleculosa, fusco-lutea." Dr. Andrew Smith, author of the *Illustrations of the Zoology of South Africa*, tells me that the fæces are in little balls, something like rabbits' dung. He also informs me that in the places where the animals live at the Cape, the fæces occur in heaps, while the hyraceum is found in the crevices of the rock, as if it had run off in a liquid state, from which he inferred that it was a product of urine and excrement.

Schrader (*Berlin. Jahrb. für d. Pharmacie*, 1818, p. 51) submitted hyraceum to chemical examination, and found its constituents to be as follows :—

Stearine (*Talgsubstanz*)	1
Green resin, soluble in absolute alcohol	2
Odorous yellow substance, soluble in ordinary alcohol and in water	38
Brown substance, soluble in water	25
Insoluble residue (vegetable fibre, quartz sand, &c.)	34
	100

From his experiments, Schrader concluded that hyraceum was for the most part of an animal nature, very probably an excretion, and that its medicinal properties resided in its odorous yellow constituent, which dissolved both in spirit and in water. Its colour did not arise from the presence of blood, for he left a decoction of hyraceum exposed to the air for some weeks, without finding that it underwent putrefaction or any change of odour. It still retained the smell of Canadian castoreum, and had scarcely any effect on reddened litmus paper. By distillation with water, a distilled liquid was obtained, which had a feeble, faint, somewhat resinous odour, but no reaction on test paper. The minute quantity of urine, therefore, which it contained, must be regarded, like the sand and the vegetable substances, as an accidental impurity, although it is not impossible that these substances may be due to the intermixture of animal excrement.

With regard to the medicinal qualities of hyraceum, I have very little to say. My sample is too small to enable me to make any experiments with it. I believe it to be inert and useless; but it has been supposed to resemble castor in its nature, odour, and medicinal qualities. "The action of hyraceum," says Dr. Martiny, "is exactly the same as that of American castor, for which it may be substituted." But to say that hyraceum is equal to castor in medicinal properties, is, I believe, to say little in its favour; for, in my opinion, there is no valid evidence that castor possesses any medicinal power whatever. Considered in an anatomical and physiological point of view, both castor and hyraceum possess some interest, but as therapeutical agents they are worthless. The remedial use of sexual and anal secretions and of excrements (*e.g.* castor, musk, civet, ambergris, album græcum, and hyraceum) belongs to the superstitious and absurd practices of a former age, and the administration of such disgusting and useless substances, should be banished from scientific medicine.

It has been used in the form of powder, or of tincture.

[Since the above was in type the following note has been received.

Royal College of Surgeons, London, Tuesday, 4 *p.m.*

My dear Sir,—I have examined, with Prof. Hyrtt, of Vienna, a fœtal male and female hyrax, and can detect no trace of any glands likely to produce the hyraceum. Yours in haste,

To Dr. Pereira. John Quekett.]

NOTE ON THE PRODUCTION OF MANNITE BY THE ACONITUM NAPELLUS.

BY MESSRS. T. AND H. SMITH.

While lately engaged in an attempt to discover the nature of the acid combined with aconitina in the root of *aconitum napellus*, we had occasion to observe that the mother liquid from which the aconitina had been separated, contained a crystallizable substance, which, on separation and purification by repeated crystallizations, turned out to be a neutral substance possessing all the characters of mannite. Analysis proved it to be mannite beyond a doubt. 0.242 grammes substance gave 0.350 carbonic acid, and 0.1675 water, corresponding to C. 0.0954; H. 0.0186, which quantities brought to hundredths, give

C............... 39.42
H............... 7.69

On comparing these numbers with those obtained by calculation from the known composition of mannite, the numbers agree so closely, that no doubt can remain as to its nature.

$$\begin{array}{lr} \text{C. } 6 \text{ eq.} \times 6 = & 36 \\ \text{H. } 7 \text{ eq.} \quad\;\; = & 7 \\ \text{O. } 6 \text{ eq.} \times 8 = & 48 \\ \hline & 91 \end{array}$$

which numbers brought into 100 parts, give

$$\begin{array}{r} 39.56 \\ 7.69 \\ 52.74 \\ \hline 99.99 \end{array}$$

For the analysis, we are indebted to the kindness of our esteemed friend, Dr. Stenhouse, of Glasgow.

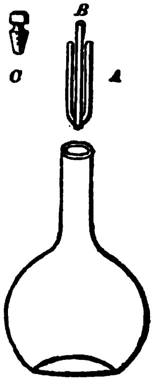
The process by which the mannite was obtained by us was as follows: the mother liquid from which the aconitina had been precipitated by aq. potassæ, was evaporated to a soft extract, which was then subjected to the action of a sufficiency of rectified spirit. From the filtered spirituous solution, the potash was precipitated as sulphate by the careful addition of sulphuric acid. The liquid after this operation, having been again filtered, was set aside for slow evaporation. In about four weeks a mass of crystals had formed. These were then separated by pressure through a cloth from the liquid, which was so thick, that the press could not safely be brought home in less than three days. The substance left in the cloth was now dissolved in water, by the slow evaporation of which, large prismatic crystals formed, which, by several crystallizations from water, and finally from boiling spirit, was obtained quite pure.

21, *Duke Street, Edinburgh*, 16*th August*, 1850.

[We have received two specimens of mannite from Messrs. Smith, one from aconitum napellus, the other from taraxacum. They are deposited in the Museum of the Society.—Ed.]

IMPROVED SPECIFIC GRAVITY BOTTLE.

BY MR. JOHN ABRAHAM.



I HAVE lately had constructed a specific gravity bottle, which I think will be found useful in ascertaining the specific gravity of fluids, particularly when the temperature of the apartment in which the experiment is performed exceeds that at which the specific gravity of the fluid is required.

I take a flask of the ordinary form, to which is fitted a hollow stopper (*A*), passing some distance within the flask. This stopper has a small orifice at the lower end and a larger at the upper. The lower orifice is closed by a long stopper (*B*) fitting inside (*A*), and which can be removed after (*A*) is put into the flask. There is a third stopper (*C*) which fits (but not closely) the top of the first named one (*A*).

The apparatus is used thus—The flask being filled with the fluid at the required temperature, the stopper (*B*), first slightly greased at the point, is placed within (*A*) so as to close the lower orifice of the latter. The two are then pressed into the flask. *B* is next withdrawn, and *C* substituted for it. The apparatus may be then deliberately wiped and weighed. The contents expanded by contact of the flask with the hand and with the warm air of the room will not be lost as they are from the ordinary bottle, but will be received into the hollow stopper and weighed. The stopper *A* is represented in section.

Bold Street, Liverpool, Aug. 19, 1850.

ADULTERATION OF ISINGLASS.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—The exposure in your late articles of the alleged fraud in the preparation of isinglass has given rise to considerable excitement amongst the dealers generally; the ingenuity of the adulteration, the great difficulty of detection, and the mischief to be apprehended from the use, alike awaken our concern; but the question assumes to me a still more serious importance, as, in the manufacture of some of my plasters it is imperative that the purest and best isinglass should be employed, and that it should be entirely free from foreign or deleterious matter.*

Feeling deeply interested in this matter, I have forwarded samples of isinglass to Dr. Letheby, &c. &c., for test and report; his analysis I have much pleasure in submitting to your readers.

I am, Sir, your obedient servant,

Robt. Macord.

58, *Minories, London,*
August 24th, 1850.

London Hospital, August 1st, 1850.

To Mr. R. Macord.

Sir,—I have made a careful examination of the isinglass, marked Dawson and Morris, which you left with me at my laboratory on Saturday last, and having compared it with several varieties of genuine Russian isinglass, I am of opinion that it is an adulterated article, the adulteration being an amorphous form of gelatine. The evidence on which I found my opinion is as follows:—

1st. *The odour of the isinglass is not good;* for, while Russian isinglass has only a slight fishy or sea-weed-like smell, this isinglass has a distinct odour of decomposing animal matter, the odour being very evident when the fibre is breathed on, and still more so when it is treated with a little boiling water.

2d. *The flavour of it is very unpleasant*, and reminds one of glue.

3d. *When tested with litmus paper, it exhibits a strong acid reaction*, which good isinglass ought not to do.

4th. *Cold water acts on it in a very remarkable manner*, for, when Russian isinglass is treated with cold water, it merely swells up, becomes opaque, and, if the isinglass is cut very fine, the fibre disintegrates a little, but it never produces any great amount of broken down flocculi, nor does the water, in which it is soaked for twelve hours or so, ever assume a gelatinous character. The adulterated article, however, rapidly breaks up in water, the fibre being converted into a mass of flocculi, and in twelve hours, the water loses its fluidity, and sets into a jelly.

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* We can bear testimony to the value of this test of the purity of isinglass, having been engaged, some years ago, in experiments on the manufacture of Liston's isinglass-plaster. Pure isinglass always answered the purpose perfectly. When gelatine was tried the result was an entire failure; and a mixture of the two, in any proportions, could be readily detected by the inferiority of the plaster, which was less adhesive, more liable to crack and cockle—and, in fact, almost useless.—Ed.

5th. *A solution of caustic potash, after acting on the isinglass, leaves a much larger amount of undissolved flocculi than it ought.*

6th. *A strong solution of oxalic acid acts differently with it, and leaves a more abundant deposit* than it does with genuine Russian isinglass.

7th. *The ash* which results from the incineration of good Russian isinglass is of a deep red colour; it contains but a small portion of carbonate of lime, and never amounts to more than .9 per cent. of the isinglass used, while that obtained from the adulterated article is paler in colour, it effervesces more distinctly with acids, and it amounts to 1.42 per cent.

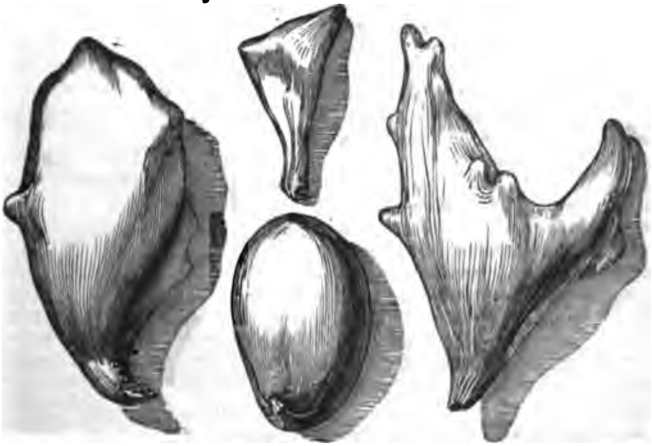
8th and lastly. When examined under the microscope, the Russian isinglass always exhibits an organized structure throughout its entire mass, the structure being either fibrous, cellular, or epithelial, while the adulterated article presents, in addition to the preceding, a very distinct layer of unorganised, amorphous, transparent matter, which is identical in all its characters with common gelatine.

From all which, I am led to conclude with Mr. Redwood, "that a most ingenious but unwarrantable system of adulteration is adopted in the manufacture of cut isinglass."

I remain, Sir, &c., &c.,
H. LETHEBY, M.B.,
Lecturer on Chemistry and Toxicology in the Medical College of the London Hospital.

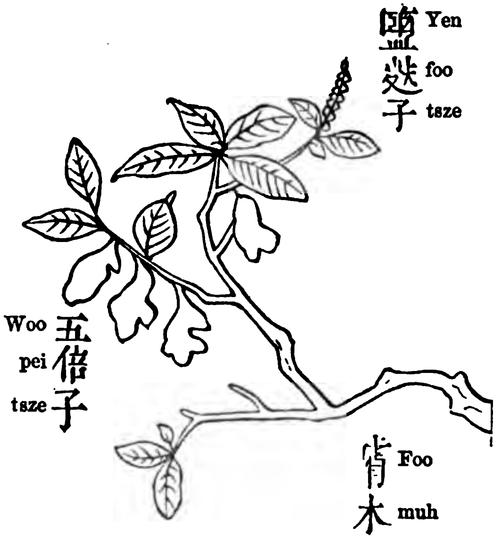
CHINESE GALLS.

IN the Pharmaceutical Journal for February, 1844 (vol. iii., p. 384), is a paper by Dr. Pereira on the *Woo-pei-tsze*, or *Chinese Gall*. The same number also contains some remarks on this gall by M. Guibourt, who terms it the *Cauliflower Gall*.



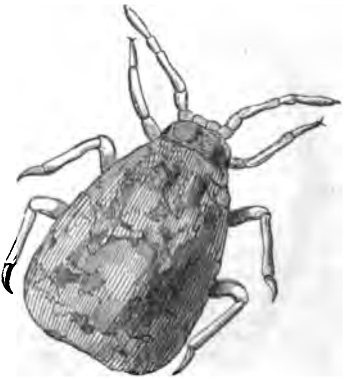
Chinese Galls, or Woo-pei-tsze.

At that time these substances were mere botanical curiosities; but subsequently they have been imported and offered for sale as astringent substances. At the time when the above notices appeared in this journal, nothing was known of the natural history of these curious productions. Dr. Pereira published a rude figure, taken from a Chinese Herbal (*Pun Tsaou*), representing a branch of a tree with the galls hanging therefrom.



Branch of *Yen-foo-tsze*, with the *Woo-pei-tsze* growing therefrom.

In the Pharmaceutical Journal for January, 1848 (vol. vii., p. 310), is a note, by the late Mr. Edward Doubleday, of the British Museum, *On the Insect forming the Chinese Galls*. Mr. Doubleday found in the interior of the galls a minute Aphidian insect, which he has described and figured; and by which there is every reason to believe these galls are formed. Mr. Doubleday terms the insect an *Aphis*, though he thinks that it may perhaps, be eventually formed into a distinct genus in the family to which it belongs. Provisionally, perhaps, we might call it *Aphis Chinensis*.



Chinese Gall Insect.

In Buchner's *Repertorium für die Pharmacie* (3tte Riehe, Bd. v., Heft 1, P. 26, 1850) is an elaborate paper on these galls, by Dr. Schenk, who, however, appears to be unacquainted with the notices of these curious productions by Dr. Pereira and Mr. Doubleday. Dr. Schenk, from a careful examination of the fragments of leaves and petioles found among the galls, has arrived at the conclusion that the tree on which these bodies are formed is a species of *Rhus;* probably *R. semialata* of Murray, var. *β. Osbeckii*, De Cand. (Prodr. vol. ii., p. 67), a native of China, Japan, and Java. This genus belongs to Jussieu's order *Terebinthaceæ*—the *Anacardiaceæ* of Lindley. Kaempfer in his *Amœnitates exoticæ* (fasc. v., p. 895) notices a plant under the name of *Baibokf*, vulgo *Fusj;* and at the conclusion of his brief description of it says "*ἐπίφυσι foliorum informi tuberosa multiplici, tenui, dura, cava, Gallæ nostratis usum præstante.*" On comparing this plant (*Baibokf*) with *R. semialata* and *R. Chinensis*, Dr. Schenk finds that it agrees better with the former than with the latter species.

Another opinion respecting the species which yields the Chinese galls has recently been offered by M. Guibourt (*Hist. Naturelle des Drogues*, t. iii., p. 703, 4me ed. 1850), on the authority of M. Decaisne, Professor at the Muséum d'Histoire Naturelle, who states that the tree appears to be the *Distylium racemosum* of Zuccarini (*Flora Japonica* I., p. 178, t. 94), a large tree of Japan, belonging to the family *Hamamelidaceæ*, and whose leaves are frequently punctured by an Aphis, by which villous galls are produced, which are similar to those called *woo-pei-tsze.*

ON COLD WATER AS A SOLVENT OF THE ACTIVE PRINCIPLES OF DRUGS.

BY MR. RICHARD BATTLEY.

In the preparation of medicines, there are a few points to which I have especially directed my attention, and to which I shall take this opportunity of inviting your attention, believing that the conclusions to which I have come, suggest the general introduction of a new form of medicine, and of an important alteration and improvement in one now in common use.

1. The superiority of cold to boiling water as a menstruum for nearly all vegetable substances.
2. The quantity of water to be employed.
3. The extent to which the evaporation of the product can be safely and advantageously carried.

1. The object of the various menstrua employed, as hot and cold water, spirit, ether, vinegar, &c., is of course to dissolve the active principles with as little as possible of the inert constituents, which not only do not improve, but often greatly impair the properties of the medicine. I believe I have employed cold distilled water for this purpose far more largely than has been customary in this country or elsewhere; but the Edinburgh and Paris Pharmacopœias have, in their last editions, adopted it to a much greater extent than formerly. The advantages of cold water, that is, of water at the ordinary temperature of the laboratory, say 60 to 65, are, first, that it dissolves from the tissue of plants, in two or three macerations, all or nearly all the active principles soluble in boiling water, spirit, or ether, taking up even resin abundantly when mixed with gum, the possibility of which, even out of the tissue, was long ago shown by the late Dr. Babington; secondly, that it does not dissipate, but retains the

volatile matters; and, thirdly, that it leaves behind the starch. Extracts prepared from such infusions are more aromatic, more transparent, more soluble, and less liable to decomposition. If it is objected that the produce is often considerably larger when the boiling temperature is employed, I admit it. So also is the bulk of scammony when adulterated with flour and chalk. But virgin scammony has not a greater superiority over the adulterated drug than has the high-flavoured, soluble, translucent product of cold maceration over the nauseous, half-soluble, hard, opake, starchy extract produced by boiling.

2. The quantity of cold water is also important. I have been led to adopt as a rule for the maceration of most substances, twice their weight of cold distilled water, adding for each subsequent maceration as much additional distilled water as the amount of infusion previously drained off or expressed. To be thoroughly saturated with this small quantity of fluid, the article must be coarsely powdered, bruised, or cut into small pieces, and repeatedly pressed into the fluid with a rammer or with the hand. The specific gravity of the infusion seldom increases after four or six hours' maceration. In some cases, as roots, leaves, hop, colocynth, &c., strong pressure is absolutely necessary to displace the fluid: but in the case of barks coarsely powdered, three-fifths of the fluid will generally drain off without pressure, if time be allowed. If a larger quantity of water is employed in maceration, the additional matter taken up is chiefly gum and other inactive principles, and the medicine is both weakened and impaired by their addition, and is liable to become further deteriorated by the longer continuance of the heat required to get rid of the superfluous water.

3. To preserve watery extracts and for the convenience of exhibition, it has been customary to reduce them to a pilular consistence. To this there are serious objections. Extractive matter is rendered less soluble by the separation of its water, and by the heat required for its evaporation: and the constituents, by being brought into too close contact, form new and often very insoluble compounds, and continue to do so long after the completion of the extract, until the properties and value of the medicine are materially changed. To guard against these changes and to preserve the solubility of the extractive matter, I introduced in 1818, the form of Liquor, or inspissated cold infusion, evaporating the cold infusion at a temperature not exceeding 160, to the specific gravity of 1200, and afterwards, to preserve this liquid extract from decomposition, adding to it as much rectified spirit as will reduce the specific gravity to 1100.

These liquors, of which I have prepared about twenty kinds, have been largely employed for many years, and the constant demand for them may be offered as evidence of the satisfaction they have given, of which satisfaction I have also received from all quarters the most ample assurance.

Believing then confidently that cold water is capable of producing the most elegant and useful preparations of vegetable substances, I am very anxious to impress on you the conviction to which I have been led by the constant superintendence of the operations of the laboratory, conducted under my own eye, and mostly by my own hands.

Should this form of medicine hereafter be adopted into the Pharmacopœia, it will be found that though the process is extremely simple, much care and attention are necessary to produce the proper result. Above all, the evaporation should be conducted at a temperature not exceeding 160, and continued till the specific gravity reaches 1200, in order to secure the same uniformity in the result, which is obtained by reducing the extract to pilular consistence. The evaporation of the infusions to a definite quantity would have a very different result; for one sample of a drug will often yield to water two or three times as much as another.

AMERICAN LARD, AND ITS OLEINE CALLED LARD-OIL.

It is a remarkable fact, that Druggists are able to offer fine American lard at prices which stand in no proportion to those customary with us; but the following statements, partly communicated by a gentleman who had resided for three years in Cincinnati, and partly extracted from a statistical report of the commerce and industry of Cincinnati, give us an explanation of the circumstance. According to an official report of the United States of America, the number of pigs amounted, in the year 1840, to 26,301,393. But in 1847 the number had increased to about 45,000,000. In the valley of the Mississippi there are farmers who keep as many as 1000 pigs, some of which weigh 700lbs. each. They are mostly fed with acorns, the fruits of various species of juglans, and with maize The town of Cincinnatti, situated in a very fruitful district, is the principal market for both pigs and pork in all Northern America. Most of the inhabitants are engaged in this trade, which commenced in 1826, but did not attain any great importance until 1833. In that year 85,000, but in 1847 250,000 pigs were there sold, cured, and otherwise prepared for sale. The slaughter-houses in Cincinnati are very spacious and conveniently arranged. The animals are killed by a blow, and, in some larger establishments, by cutting off the heads of a number at one stroke by an instrument resembling a guillotine. The scalding is done in troughs, the water being kept hot by heated stones. One journeyman butcher in general cures thirty-one pigs daily. Not unfrequently Germans have exported to Germany from Cincinnati fresh salted hams in casks, the process of pickling going on during the voyage, and on their arrival nothing but smoking them was required. In the year 1848, 8000 hams were thus imported into Westphalia. In North America large quantities of saltpetre (Chili saltpetre ?) are used, probably for the better preservation of the meat, which in time becomes much tougher in consequence. The killing season begins about the middle of November and lasts four months. The meat and bacon of about half the number of killed animals is pickled and brought to the sea-port towns of America for the supply of the shipping. In addition, large quantities are carried into the interior, and are likewise exported to the West Indies and South America. Smoked hams also find a ready sale in the latter countries. It is calculated that about 6000 persons are engaged in this trade, amongst whom are 1500 coopers. One of the principal products of the killed pigs is (besides the pork, bacon, candles, soap, leather, and bristles) the lard, both for exportation and home consumption. Packed in tin and wooden boxes considerable quantities of lard are every year exported to the West Indies, especially to the Havannah, where it is used instead of butter. In North America, which produces plenty of the latter, the lard is made little use of. A great quantity of lard in a solid and liquid state, in the form of oil, is exported to France and England as well as to the eastern parts of the United States. In the seaport towns of the latter, and also in Cincinnati, the manufacture of lard-oil forms an important branch of industry. In one of the greatest slaughter-houses in Cincinnati, where every year about 30,000 pigs are killed, exclusively for the purpose of extracting the lard, the animals are thrown, after nothing but the hams have been cut off, into seven large butts, six of which hold 15,000lbs., and one 6000 lbs. These masses of pork, fat, and bones, are, by means of a steam-engine at a pressure of 70 lbs to the inch, so compressed that even the bones become quite pulverized. The fat is conducted by tubes furnished with cocks into other vessels, and the residue used as manure or for the manufacture of prussiate of potash. In this manner 600 pigs are, on the average, daily treated in this manufactory, besides the refuse brought from other slaughter-houses, such as heads, bones, ribs, &c. The quantity of fat obtained in this way is clarified by a steam apparatus into the purest and finest lard; from this the lard oil is prepared by depriving the lard of the stearine contained in it. This stearine is identical with that which was first imported to Germany in the year 1840, under the name of *solar-stearine.* About thirty manufactories of lard-oil exist in Cincinnati, the largest of which has till now produced 140,000lbs. of oil and stearine, and is still on the increase. In the year 1847 11,000,000lbs. of lard were manufactured; five-sevenths of which quantity were used for making oil, which filled 24,000 casks, each containing forty-one to forty-two gallons. The other two-sevenths were used for stearine. The lard-oil is used in the eastern states of North America for mixing with sperm-oil: in France, however, large quantities are employed for adulterating olive-oil. The French Chemists are so skilful in this respect that they can mix sixty-five to seventy per cent. of lard-oil without the adulteration being easily discovered. If, however, the oil is left standing for some time at a low temperature, a quantity of stearine subsides to the bottom of the bottle (?)

In order to manufacture candles from the stearine it is compressed by an hydraulic-press to five-eighths of its volume; the other three-eighths, which flow off as impure oleine, are used for soap-boiling. Till 1847 at least 3,000,000lbs. of stearine were every year manufactured in Cincinnati into candles and soap, and the manufacturers expect they shall be able in future to furnish, on an average, every day 6000lbs. of candles.

From the refuse of those pigs killed for other purposes, and from the flesh of dead animals, in which about eighty per cent. of lard are contained, the latter is extracted for the use of soap-boiling only. 100,000lbs. of common soap, of the annual value of 200,000 dollars are thus manufactured, and as much of a better quality, that this value is increased by one-fourth.

Although the glue extracted from the feet of the pigs has but little value; yet the value of the bristles amounts annually to 50,000 dollars. About 100 persons are engaged in preparing them, and they are exclusively sold in the interior of the country.

All other parts, as, for example, the hard parts of the feet, &c., are manufactured into prussiate of potash. The cotton-printers in New England lay a great value upon this pigment. The blood of pigs is said to yield a beautiful Prussian blue. The American lard is distinguished from others by a greater proportion of oleine, probably in consequence of the kind of food, of the mode of fattening, and of the peculiar preparation; for American lard is not merely extracted from the fat deposited near the kidneys, but from all parts of the animal indiscriminately, including the marrow of the bones and the fat of the brain.—*Jahrbuch f. Pract. Pharmacie,* January, 1850, p. 6.

ON ERGOTIN AND EXTRACT OF ERGOT.

BY DR. INGENOHL.

Ingenohl, an Apothecary at Hohenkirchen, in Oldenburg, has directed public attention to the different preparations sold under the denomination of Ergotin, which name, strictly taken, applies only to the strongly narcotic substance discovered and described by Wiggers. This preparation is very different from the ergotin prepared by Bonjean, though the two might be easily mistaken for one another by the similarity of their name.

The author prepared ergotin by Wiggers's method, and obtained, from three ounces of Secale cornutum, 13½ grains of ergotin. Wiggers himself states, that from one ounce of ergot only six grains of ergotin can be extracted.

This small produce, and the price of the ergot, are inconsistent with the prices of the preparation, which is sold by many houses as ergotin, namely, from one to less than two dollars (three to six shillings) per ounce, whilst the pound of ergot costs from eighteen groschen to one dollar five groschen (2*s*. 3*d*. to 3*s*. 8*d*). It may, therefore, be presumed that this cheap ergotin is that prepared by Bonjean's process, and which, according to Wittstein (*Etymol. Chem. Wörterb.*, article *Ergotin*), is only the aqueous extract of ergot.*

For the Physician this circumstance is of especial importance, since Wiggers's ergotin operates very violently; nine grains of it being able to kill a strong fowl on the third day, whilst the watery extract has no detrimental effect upon chickens.

Bonjean's ergotin, the watery extract of secale, for which already Buchner proposed the name of *Extr. Secalis cornuti*, in doses of one to two grains, is an excellent remedy in hemorrhages in general. In large doses, however (thirty grains within two hours), this extract appears, according to Prof. Sachers, of Turin, not to have the least effect upon the uterus.

As regards the effect of ergotin upon the uterus, it is maintained that the ergotin which is soluble in spirit of wine, is the active constituent which promotes the contraction of the uterus during labour. But this is in contradiction with the fact that Physicians frequently prescribe watery infusions and decoctions of ergot for the same purpose; whereas ergotin is insoluble in water. This property of promoting the labour does not, therefore, belong to ergotin. — *Pharm. Central Blatt.*, 1850, No. xxvii., p. 432.

ON SECALE CORNUTUM AND ITS FIXED OIL.

BY DR. BERTRAND.

The statement of Bertot, that secale cornutum, mixed with musk, destroys the smell of the latter, is denied by Dr. Bertrand. Triturations of half a grain of musk with eight, ten, twenty, thirty, and sixty grains of ergot developed, during the trituration, a smell of ammonia, which disappeared after a short time, without the smell of the musk being diminished.

The fixed oil of ergot obtained, according to Hooker and Wright, by means of ether, is in general of the same nature as other fixed oils. It is colourless, or only slightly coloured, and has a bland not acid taste. To this oil the whole therapeutic virtue of the ergot, or at least a narcotic effect, has been ascribed by many ; but the author has made experiments with it on himself, and could not discover any medicinal effect. He even took half an ounce of the oil, rubbed down with mucilage of gum arabic, having previously given to dogs, cats, and rabbits from two drachms to one ounce at a dose, and experienced nothing but loss of appetite for a few days, but not the slightest narcotic poisonous symptoms.

If the ergot be powdered only shortly before its administration, a uniform effect may always be expected from it ; also if it is kept for some time in paper, by which the fat oil is extracted from it. If, however, it be kept, as usually is the case, in closed vessels, and dispensed without first being deprived of the fat oil, the effect of the ergot is very uncertain. The effects of ipecacuanha and ergot *in plena et nonfracta dosi*, appeared to the author very remarkable : both contain fat oil. Ergot, freed from the fat oil by ether, has long been employed by Kilian, of Bonn, with the best effect.—*Pharm. Central Blatt*, 1850, No. xxvii., p. 430.

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* *Bonjean's Ergotine* is, as above stated, an aqueous extract of ergot. It is prepared by the displacement process. (See Gray's *Supplement*, by Prof. Redwood, second edition, pp. 682-3.) *Ed. Pharm. Journ.*

ON WINE.

BY MR. F. L. WINCKLER.

In order to discover the reciprocal chemical relations of grape-wine, apple-wine (cyder) and Madeira-wine, Winckler made several experiments, the results of which are the following:—

I. Grape-Wine.—This wine had been kept in the cellar for two years, was perfectly clear, and of a pale wine-colour. In addition to the usual qualities of grape-wine, it had a specific gravity of 1.0043.

(1.) *Alcohol.*—On being mixed with double its volume of alcohol the mixture became cloudy, and in twenty-four hours a thin crystalline crust of bitartrate of potash, containing some lime, was deposited. The supernatant liquid was clear and nearly colourless.

(2.) *Lime-water.*—Upon the addition of three volumes of lime-water the wine immediately became darker, the mixture became cloudy, and, after a very short time, yielded an inconsiderable but very voluminous flocculent brownish-yellow precipitate.

(3.) *Chloride of iron* coloured the wine pale grass-green, but no precipitation took place.

(4.) *Acetate of potash* was at first without effect, but after some time a small quantity of bitartrate of potash was precipitated.

The solid constituents of this wine, after evaporation, consisted of 2.45 per cent. of a dark yellowish-brown matter containing free tartaric acid.

The alcohol obtained from this wine by distillation and rectification over a small quantity of potashes, amounted to 5.5 per cent. (alcohol of 46 per cent. by weight), and possessed a strong smell of œnanthic ether. The residue of the rectification yielded six grains of acetate of potash. In the residue, after the first distillation, free tartaric acid, besides bitartrate of potash containing lime, was found.

II.—Cyder.—Two years old, perfectly pure, and of the best quality. It was of a very deep yellow colour, very slightly mucilaginous, taste and smell purely of fruit, not vinous and little spirituous. It coloured the litmus paper as intensely as the above described grape-wine. Specific gravity 1.009.

(1.) *Alcohol.*—One volume of wine with two of alcohol gave a cloudy white mixture, which in twenty-four hours yielded an abundant white flaky precipitate, which was analogous to vegetable mucus.

(2.) *Lime-water* in excess produced instantaneously a light brownish-red colour; in twenty-four hours an inconsiderable, very voluminous, light reddish-brown flocculent precipitate was formed.

(3.) *Chloride of iron* produced immediately a deep greenish-brown colour; in twenty-four hours a considerable quantity of a dirty greenish brown powder had fallen down.

(4.) *Oxalate of ammonia* was directly followed by the precipitation of oxalate of lime.

The *solid constituents* when perfectly dry amounted to 2.2 per cent., and could be re-dissolved in water with a light greyish-brown colour, inclining to violet, the water acquiring at the same time a strong acid re-action and fruity smell. This solution soon became mucilaginous. The proportion of alcohol obtained by distillation and rectification over carbonate of potash, was 2.7 per cent. of the cyder. It smelt exactly like fresh apples, and the residue contained a small proportion of acetic acid, in which butyric acid and formic acid could be detected by the smell. From the evaporated residue after the first distillation, lactate of lime was obtained by recrystallization. The free acid which remained in the mother-liquor was lactic acid. On repeating the experiment with a larger quantity of another cyder, the author obtained so great a quantity of lactic acid that further examinations could be instituted and its presence proved beyond doubt. The cyder contained no bitartrate of potash, but lactate of lime and free lactic acid. In order to obtain the lactic acid in a pure state, Winckler recommends the liquid to be digested with oxide of lead, and the lead salt to be decomposed by sulphuretted hydrogen.

The distinguishing characteristics of grape-wine and cyder are, therefore, the presence of bitartrate of potash and œnanthic ether in the grape-wine, and a greater proportion, at least five per cent. of alcohol, but a less proportion of tannin than in cyder. The latter, on the contrary, contains lactate of lime and free lactic acid, vegetable mucus, and a considerably greater proportion of tannin, which colours the iron green. On the average, also, a smaller quantity of alcohol, which even in the best pure cyder does not exceed 3.5 to 4 per cent. by weight. The peculiar smell of cyder is perhaps to be ascribed to the butyric ether. Mixtures of grape-wine with cyder can be easily detected by the presence of bitartrate of potash and lactate of lime with free lactic acid.

III. MADEIRA-WINE.—Light brownish-yellow, of a well-known taste; strongly reddens litmus. Specific gravity 0.99175.

(1.) *Alcohol.*—Mixed with double its volume of alcohol, the wine became cloudy, and after some time a few crystals of bitartrate of potash appeared.

(2.) *Lime-water* in excess produced instantaneously light brownish-yellow turbidness; after twenty-four hours an inconsiderable, very voluminous precipitate of the same colour had formed.

(3.) *Chloride of iron* caused a light brownish-green colour without precipitate.

(4.) *Acetate of Potash* was followed after some time by the formation of a very small quantity of bitartrate of potash.

(5.) *Neutral tartrate of potash* threw down, after a short time, a rather large quantity of bitartrate of potash.

(6.) *Oxalate of ammonia* precipitated a trace of oxalate of lime.

The solid constituents consisted of 3.6 per cent. of a saccharine strongly acid matter, which dissolved in water with a yellowish-brown colour, from which solution afterwards a small quantity of tartrate of potash separated.

The proportion of alcohol was 10.6 per cent. of the wine: it contained a small quantity of butyric ether. Lactic acid could not be discovered in the residue after distillation.—*Pharm. Central Blatt.*, 1850, No. xxviii., p. 433.

ON THE MANUFACTURE OF PYROLIGNOUS ACID, PYROXYLIC SPIRIT, OR WOOD NAPHTHA, AND THE COMMERCIAL ACETATES OF LIME, SODA, AND LEAD, AND ACETIC ACID.

(*Continued from page* 73.)

PART IV.—*Manufacture of Acetate of Lime.*—The commercial acetate of lime is of two qualities, respectively designated grey and brown lime salt; these are obtained by saturating with lime either the distilled acid before mentioned, or the undistilled acid after the pyroxylic spirit has been removed by distillation, and evaporating the clear solution almost to dryness, or by evaporating the solution of acetate of lime as run off from the stills in the case in which the crude acid has been neutralized with lime previous to the distillation of the spirituous product. This saturation either of the crude acid previous to distillation, or the distilled acid, or the undistilled acid, is in either case performed in the same manner. The acid liquor is passed into wooden or iron vessels of convenient capacity, say from 500 to 1000 gallons each, and a quantity of either powdered chalk or of slaked and sifted lime, previously made into the consistence of cream with water, is added until the blue colour of litmus paper is no longer reddened; a slight excess of lime is then added, with a view to render the separation of the oily matters more complete. A portion of the tarry matters are carried to the bottom with the impurities of the chalk or lime employed, and part of the oily matters, combined with the lime, float on the surface, and are removed by skimming. The solution of acetate of lime when clear, is ready for the evaporating pans, which are either wooden vessels lined with lead and furnished with coils of wrought iron steam pipes in connection with a boiler, or shallow pans of sheet iron, set over a naked fire—the boiling solution is repeatedly skimmed to remove the tarry matter floating on the surface; and the salt as fast as formed is fished out by means of large skimmers, and thrown into wicker baskets suspended over the pans, so that the liquor draining from the salt may not be allowed to cool. The following practical result was obtained by the use of three sheet-iron pans about eighteen inches in depth, and capable of containing 450 gallons of acetate of lime liquor each:—First six days of 24 hours each, 7020 gallons of liquor were evaporated, producing 78 cwt. of dry acetate of lime. Second week, 8060 gallons were evaporated, producing 92 cwt. of dry acetate. Third week, 7000 gallons were evaporated, producing 78 cwt. of dry acetate. Two of the pans contained brown acetate of lime liquor, and the other grey acetate liquor.

The next part of the process is the drying of the drained acetate of lime. This is usually effected by placing it on the top of the mass of brickwork in which the retorts, or cylinders, or ovens, are set; but as there is seldom room to dry the whole of the salt in this way, many works are furnished with a drying-house in addition, and, where the lime is made on the spot, the waste heat from the kiln or furnace is made available for drying the acetate, it being made to traverse the flues beneath the floor of the drying-house. As a general rule, however, the drying of the acetate of lime is a part of the process of this manufacture by no means well executed, requiring as it does more attention than the workmen are usually disposed to give to it.

Some very good directions have been given by Plücker for the manufacture of acetate of lime, though some of them are not readily practicable on the large scale, and would require more additional labour and fuel than would be compensated for by the extra price to be obtained for the acetate in the market. He recommends the filtration of the crude acid through layers of saw-dust and gravel before it is neutralized with lime, and that the solution of the acetate having been brought to boil, should be filtered or allowed to stand for thirty-six or forty-eight hours; also that at two subsequent periods of the operation the solution of lime salt should be drawn off from the evaporating pans, and either filtered or be allowed to settle, and the clear liquor further evaporated. As for filtration, that is quite out of the question, but it is certain that much impurity is deposited when the hot solutions are allowed to cool. In works where 10,000 gallons of lime salt liquor are made every week and have to be evaporated, this could not be effected without a considerably increased expenditure of fuel and labour. The following sketch of a drying furnace and of directions for drying the acetate of lime will be found useful.

The drying furnace is a simple wind furnace, seven or eight feet long, and four and a half to five feet broad, built of brick. At six inches above the ground is the ash-pit, eight inches broad and twelve inches high, which is covered with a grate of bricks. The fire-place is twenty inches high, and ten inches broad at the grate; over it is an arch of bricks, so that the fire cannot play on and heat very highly the iron drying-plate lying on the side of the hearth. The space below the drying-plate is separated from the hearth by a partition of bricks three or four inches high; twelve inches above the outlet of the earth there is a layer of iron bars, one and a half to two feet from each other, and upon these is deposited the drying-plate. This consists of cast-iron, one quarter of an inch thick, and is formed according to the size of the furnace. Round the plate the furnace is built up to the height of ten inches, on the side of the front wall, leaving room for doors, which may be calculated at two and a half feet. These doors are two, one above the other, through which the whole interior of the furnace can be inspected. They are formed of plate-iron, and have in their middle a sliding door to admit of the exit of the vapour of the acetate of lime, and of some ventilation. A wall built at the end of the plate, or a clay partition, separates the whole of the drying plate from the chimney. In the walls of the furnace iron bars are fixed, and upon these bars a second drying-plate, which covers the drying space. This plate, as it does not come in contact with the fire, may consist of good iron or of clay.

Above this drying space another is formed by means of the chimney. The heat passes as well under as above the drying space, and passes into the chimney, which is situated at the side of the furnace, and can be shut by a valve. In the drying space the temperature is usually between 60° and 90° R. (167° to 234½° Fah.)

Turf forms the best material for fuel, as it does not burn rapidly, and produces a steady and equal temperature.

Drying of the Acetate of Lime.—When the furnace is thoroughly and equally heated, the flame of the fire is allowed to subside. If wood is employed as fuel, the sliding door should be opened at the commencement in order to allow the moisture to escape. The salt is transferred from the evaporating vessel to the drying plate, and spread out to the depth of two inches; and after the first portion has become somewhat dry, the depth is increased to four or five inches; the heat is preserved at the degree already mentioned, for twenty-four hours, and during this time the salt is turned several times. Subsequently, when the mass appears to be becoming dry, the temperature may be increased to 100° (257° Fah.), so as to dry it completely. The mass is dry and properly roasted when it possesses the following characters:—It must, before cooling, be brittle, easily crumbled between the fingers, mixed with blackish carbonaceous points or streaks, between which appear white pieces of dry salt. A solution of the comminuted salt, in four or six times its volume of hot water, possesses a yellowish brown colour with a dark tinge, while previously it had a reddish brown colour. When the heat is increased towards the end of the process, as described, care must be taken to do it gradually so that no smoke shall rise from the acetate, because it might thus be decomposed. Neither must any spark be permitted to come in contact with the acetate of lime; because, like sugar of lead, it possesses the property, in these circumstances, of catching fire and burning—by which the whole dry preparation would be completely destroyed. The treatment of the acetate of lime in this manner, by means of gradual drying, as experience has shown, possesses many advantages over the method of drying the salt in an open vessel; because there is no loss of acetic acid, as always occurs by the latter process. The operator has the preparation completely in his power, and with little expense of fuel and time, many hundred weights of salt can be prepared at once. This process does not merely extend to the removal of the moisture from the acetate of lime, but a chemical influence is exerted by means of it; because it is certain that the substances formed by dry distillation, which have been recently distinguished by Reichenbach, are partly dissipated by the heat, and partly decomposed, the acetate of lime possessing very different properties before and after the process. After the process the salt does not imbibe water so readily as it did previously. After solution, filtration, and evaporation, a much purer product is obtained than before, and upon the filter a resinous matter remains, the constituents of which have not yet been examined.

It will be seen from an inspection of one of the tables given under Part I., that the quantity of acetate of lime obtained from a given weight of wood varies according to the kind of wood employed; it may however be estimated on the large scale as about 140 pounds of brown salt per ton of wood of average dryness, the average result obtained at one works from nearly 2000 tons of wood, and at another from the weekly consumption of 80 tons, being as near as possible that amount; larger products have been obtained, even as high as 150 pounds, but the quantity above stated is a fair estimate of the produce on the large scale.

PART V.—*Manufacture of Pyro-acetic Spirit, or Acetone.*— The usual mode of obtaining pyro-acetic spirit is by the decomposition of the acetates by means of heat. For this purpose the acetate is submitted to dry distillation in a retort, great attention being paid to the temperature, which should be kept as low as possible consistent with the decomposition of the acetate employed. The distillation should be conducted with a slowly increasing heat, as the quicker the temperature is raised the larger is the quantity of pyro-acetic spirit destroyed, carbon remains in the retort, and the empyreumatic oil formed renders the spirit impure. In the case of the metallic acetates, water, acetic acid, and pyro-acetic spirit, pass off in a state of vapour, and are condensed; carbonic acid and carburetted hydrogen gases are the incondensable products, whilst the metallic base, mixed with some carbonaceous matter, remains in the retort. The metallic base is usually reduced to the metallic state, and the more difficult this reduction is, the greater is the quantity of pyro-acetic spirit formed.

Acetates, the bases of which retain carbonic acid at a red heat, produce, when heated in close vessels, the carbonate of the base and acetone. This takes place, for example, with the acetates of potassa, soda, and baryta. Where the oxide cannot retain carbonic acid at a red heat, as in the case of acetates of magnesia, zinc or manganese, the acetone is accompanied by carbonic acid. If the oxide be easily reducible, as in the acetates of copper, silver, and mercury, there are given off hydrated acetic acid, carbonic oxide, carbonic acid, water, and acetone, and there is left a mixture of the metal with carbon in a minute state of division.

In Thomson's *Inorganic Chemistry*, vol. ii., p. 23, edit. 1831, there is a table of the relative quantity of products obtained from the decomposition of several metallic acetates. The following extract shows the quantity of pyro-acetic spirit obtained :—

Acetate of silver	0.00
" copper	0.17
" nickel	0.20
" iron	0.24
" lead	0.55
" zinc	0.69
" manganese	0.94

The acetates of potash, soda, lime, and baryta yield a much larger proportion of pyro-acetic spirit than any of the metallic acetates, and are therefore generally employed for this purpose, more especially the acetate of lime. It would appear that the acetates of silver and of baryta stand at the two extreme points of the list of acetates in respect to the production of pyro-acetic spirit; the former yielding only a concentrated acetic acid with not a trace of spirit, whilst the latter yields a liquid product almost entirely spirituous, with scarcely a trace of acid. The acetate of copper also yields but a small proportion of pyro-acetic spirit; hence its employment, as we shall subsequently notice, in the preparation of aromatic vinegar.

Dumas submitted to dry distillation 100 parts of acetate of baryta, composed of

Baryta	56.0
Acetic acid	37.4
Water	6.6
	100.0

and capable, therefore, of yielding 21.5 per cent. of pyro-acetic spirit. The result of several experiments gave the following products :—

Carbonate of baryta	72.2
Charcoal	1.2
Pyro-acetic spirit	18.3
Water	6.6
Gas and loss	1.7
	100.0

On the supposition that the presence of the charcoal arose from the decomposition of a part of the pyro-acetic spirit, there would be about two per cent. of spirit to be added to the above, which would give near about the theoretical quantity. Taking the product at eighteen per cent., one cwt. of acetate of baryta should furnish 2½ gallons of pyro-acetic spirit. Not more than two gallons is obtained from the ordinary acetate of lime of commerce, and the results obtained by operating on some tons of this salt did not give even this amount of produce, no doubt on account of sufficient attention not having been given to the due regulation of the temperature. The acetate of lime was placed in shallow trays of about two feet square and two inches in depth, and fifteen or sixteen of these trays placed over each other in an iron cylinder employed for the distillation of wood. The crude spirit is rectified by successive distillations over quick-lime, when a limpid colourless fluid, specific gravity 0.7921, is produced. It is soluble in water, alcohol, and ether, and burns with a whitish flame.

(*To be continued*).

THE "HYDRO-CARBON," OR RESIN AND WATER GAS.

[*From a Paper by Dr. A. Fyfe, Professor of Chemistry, King's College, Aberdeen, in the Journal of Gas Lighting*, No. 6, *for* 10*th July.**]

It is well known that when water is passed over iron at a red heat, excluded from air, it is decomposed; oxide of iron is formed, and hydrogen gas is evolved, the purity of which depends on the kind of iron employed. Were the iron clean and pure, then pure hydrogen would be the result; but this very seldom occurs in practice; because, not only does the iron contain foreign ingredients, but it is soiled also by the hands and tools of the workmen in the factory from which it is procured, in the state of filings or turnings. Hence it is that the specific gravity of the gas which it yields is considerably beyond that of pure hydrogen, and the appearance of the flame is different. The light afforded is extremely faint.

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* Barlow, 32, Bucklersbury.

When water is passed over carbon, either as coke or charcoal, at a red heat, and excluded from air, decomposition ensues, and a gaseous fluid escapes, with regard to the nature of which different opinions have existed. It was at one time supposed to be, and indeed in works on Chemistry it has been described, as a mixture of a variety of gases, the principal of which is light hydro-carbon, better known as *marsh gas*, *coal-mine gas*, and *fire-damp*. More recently performed experiments, however, have proved that it does not contain hydro-carbon, or at most but a trifling quantity of it. In a paper published by me in the *Edinburgh Philosophical Journal*, July, 1837, it is shown that the gas produced by this process is a mixture of hydrogen, carbonic oxide, and carbonic acid, the proportions varying according to the heat and other circumstances. In these trials I found that the carbonic acid was about 18 per cent. After removing it, the remainder was of specific gravity 470, and consisted of a mixture of hydrogen and carbonic oxide, in about equal proportions. By combustion it yielded carbonic acid and water, the light afforded being extremely feeble. As the gas, after the removal of the carbonic acid, was of specific gravity .470, it must have been, before its removal, of specific gravity about .660.

Allowing the correctness of the results now stated, it is evident that when water is brought into contact with iron and carbon at a red heat, in the same vessel, the gas evolved will be either hydrogen alone, provided the whole of the oxygen unites with the iron; or it will be a mixture of hydrogen, carbonic oxide, and carbonic acid; the proportions varying according to the surface of carbon and iron exposed, and to the facility with which the vapour of the water is brought into contact with the one or the other. Of course the specific gravity will also vary according to circumstances. I have already said that both carbonic oxide and hydrogen burn with a very feeble flame, and give very little light. The appearance of the flame of the mixed gases will, of course, vary according to the proportions.

The following experiment was made, with the view of ascertaining the illuminating power of the gas prepared from water by the process recommended by Mr. White, though not exactly with the same arrangement. The retort used was stuffed with charcoal and scrap iron, which were brought to the proper temperature after the door of the retort was secured. Water was then allowed to flow in, the supply being regulated by a stopcock. The gas given off was measured in the usual way. From 7¼ pounds of water, 59¼ cubic feet of gas were evolved, the specific gravity of which was .574. By lime water the condensation amounted to 16.5 per cent., indicating, therefore, that quantity of carbonic acid; that is, about one-sixth of its volume. Had the specific gravity been taken after abstracting the carbonic acid, it would have been found to be very nearly the same as that formerly mentioned, that is, between .470 and .500. The gas burned with a very feeble blueish flame, yielding carbonic acid and water. With a flame five inches long from a jet with an aperture of 1-33rd of an inch, the consumption was one foot in 32 min. 30 sec., that is, 1.84 foot per hour.

The next set of experiments was made on resin, with the view of ascertaining the quantity and quality of the gas which it affords, by decomposition at different degrees of heat. The resin was melted cautiously, and poured into the reservoir connected with the retort, previously brought to the same heat as that requisite for the manufacture of coal gas. By a proper contrivance it was kept warm and sufficiently fluid to enable it to flow easily. Six pounds two ounces yielded 61 feet of gas; that is, very nearly 10 feet from the pound. The gas was of specific gravity .640. Lime water indicated 10 per cent. of carbonic acid. With a jet 1-33rd of an inch in diameter, and a 5-inch flame, the durability was 50 min.; that is, 1.2 feet per hour. By the photometer the jet gave the light of 2.2

candles per foot. The Argand with 56 holes, consuming five feet per hour, gave the light of 2.45 candles per foot.

This gas, being of specific gravity .640, a cubic foot would weigh 343 grs. The gas, therefore, in all, weighed nearly three lbs.; consequently upwards of one-half of the resin employed was wasted by the deposit of carbon in the retort, and by the distillation of volatile oil.

* * * *

I come now to consider the quality of the water-resin gas, or as it is very improperly called, the hydrocarbon gas, and its value for the purposes of illumination. This gas is generated by the decomposition of water and of resin in separate retorts; the latter being decomposed by heat, the former by heat with the aid of carbon and of iron. The gas thus produced is merely a mixture of resin-gas—that is, of a gas resembling coal-gas in its composition—and of hydrogen with variable proportions of carbonic oxide and carbonic acid, according as the water is decomposed. I regret that I cannot give the results of the manufacture of the gas by the apparatus erected under the superintendence of Mr. White, as I fully expected to have been able to do. In the different attempts which I made to ascertain the quality of the gas manufactured by that apparatus, several circumstances occurred to prevent me from arriving at the truth. In the first trial I found the gas of high illuminating power, *but it was afterwards ascertained that tallow was mixed with the resin*, in what proportion I did not hear. At my next visit the gas was made by using both retorts, employing resin for the one, and water for the other; but it was afterwards discovered *that the water retort was not in action*, consequently the gas collected was entirely that from the decomposed resin, or a mixture of resin and tallow. * * * *

I do not, however, consider this of great consequence. I have ascertained the quality of resin gas, of gas from mixture of resin and tallow, and of water gas, *separately*, and as these, by Mr. White's process, are generated in separate retorts, we must consider the gas thrown into the gasometer to be merely a mixture of those mentioned in variable proportions, according to the proportions of the articles employed in their manufacture, and the rapidity with which the one and the other is decomposed. We can thus arrive at the quality of the hydrocarbon gas, as it is called, and its consequent expense for the purposes of illumination, as compared with other sources of light; as, for instance, with coal gas.

As resin is composed of C. 10, H. 7, O. 1, the utmost that it can yield of olefiant is 49; of light hydrocarbon, about 28 from 75 of resin; that is about 64 per cent. of the former, and about 37 per cent. of the latter. But resin never yields olefiant only independent of carbonic acid and oxide, the gas is a mixture of olefiant and of light hydrocarbon, with perhaps a slight admixture of uncombined hydrogen. The gas, when it contains about 6 per cent. of carbonic acid, varies in specific gravity from about .570 to .660. I have never found the condensation by chlorine to exceed eight per cent., thus making the composition to correspond with the specific gravity; for a gas composed of eight of olefiant and 92 of light hydrocarbon would be of specific gravity a little above .600. I have no doubt that resin gas, when free from carbonic acid, will be found to be of about that specific gravity. I have stated the specific gravity of the water gas, as generated by Mr. White's process, to be about .574. Supposing that it is mixed with an equal volume of resin gas, then the specific gravity ought to be about .580, or somewhere between that and .600; that is, presuming the absence of carbonic acid. Supposing the per centage of carbonic acid to be about six, then the specific gravity would be about .630.

I must confess that I am at a loss how to reconcile this with the very remarkable statement made by Mr. White, that the gas manufactured from *resin and water* is of specific gravity .924, and contains 12½ per cent. of olefiant. A gas having 12½ per cent. of olefiant, the remainder being water gas or light hydrocarbon, would not exceed .650 in specific gravity. His gas, therefore, must either have contained much more olefiant—indeed, have been composed almost entirely of olefiant—or must have had a very large admixture of carbonic acid or carbonic oxide. Resin gas did not in my trials exhibit beyond eight per cent. of olefiant. The high specific gravity of his gas must, therefore, have been occasioned by carbonic acid or carbonic oxide, perhaps by both; the latter of which is valueless for the purpose of illumination, and the former detrimental.

With regard to the illuminating power, I have never been able to manufacture gas from *resin alone* with more than eight per cent. of olefiant. Mr. White states that, by his improved process, he gets the gas from *resin and water* with 12½ per cent. of olefiant. How is it *possible* that, by the addition of resin gas to another gas of lower specific gravity and illuminating power, he gets a gas of higher illuminating power and greater gravity? To me it is a puzzle.

That there is a large admixture of carbonic acid in Mr. White's gas, when he takes the specific gravity, appears certain. He says that now there is but little carbonaceous deposit in the retort, owing to the peculiar mode of arrangement and admission of the hydrogen and carbonic oxide. Now, as by the manner of decomposing the water, oxide of iron is formed in the retort, it is evident that the whole of the oxygen of the water is not converted to carbonic oxide by its union with carbon; the specific gravity of the gas, therefore, which is evolved from the water ought to be below .522, which is that of a mixture of equal volumes of carbonic oxide and hydrogen; but, suppose that it is not much below that, and that no carbonic acid is present, then to get from resin and water a gas of specific gravity .924, containing olefiant, with a residue composed of equal volumes of hydrogen and carbonic oxide, which it should be were all the oxygen disengaged as carbonic oxide, there ought to be about 87 per cent. of olefiant. Supposing that Mr. White's gas was a mixture of olefiant, carbonic acid, and water gas, which contains equal volumes of carbonic oxide and hydrogen, that the water gas is about .522 specific gravity, and that the olefiant was 12½ per cent, then, to have it of the specific gravity .924, it should be about 12.5 olefiant, 52 water gas, and 35 carbonic acid. Were the carbonic acid removed from this gas the specific gravity would then be a little above .600, most probably the real specific gravity of the *inflammable gas* obtained from resin and water together.

With regard to the illuminating power of the water resin gas, Mr. White has stated that "it is 26.5 per cent. superior to Manchester cannel gas, and 20.5 per cent. to the Salford cannel gas." * * * *

By the chlorine test, independent of durability, the illuminating power of Mr. White's gas, containing 12.5 of olefiant, ought to be 64 per cent. instead of 26.5 and 20.5, beyond that of the coal gases he mentions. Of course, if we take durability also into account the value should be greatly beyond that.

The specific gravity of the Manchester gas at the time I tried it was .451. The durabilities, with the same burner, are as the square roots of the specific gravities. Taking durability into account also, the illuminating power of Mr. White's gas ought to be at least 90 per cent. greater than that of the Manchester gas.

It is evident from this, either that Mr. White's gas must be one *sui generis*, or that there is some strange inaccuracy in the mode of ascertaining the quantity, and of testing its qualities. Can it be that the quantity of gas evolved, say 10,000 feet, of specific gravity .924, from six cwt. of resin and twenty-four gallons of water, and which I have said is a mixture of olefiant, light hydro-carbon, carbonic acid, and carbonic oxide, with perhaps a little hydrogen, was the quantity indicated by the meter, immediately after the gas escaped from the retort, and was then of the specific gravity stated, and that, after it had stood over water in the gas-holder for some time, and by which it would lose its carbonic acid, it *then* contained 12.5 of olefiant? If so, the quantity of gas valuable for the purpose of illumination must, by the abstraction of carbonic acid, be far below what Mr. White states. Be that as it may, till Mr. White describes more minutely than he has done, his method for finding the quantity and quality of his gas, I must adhere to the conclusions which the trials I have now recorded warrant, viz., that the quantity and quality of gas, after being properly purified, will be found to be far inferior to what Mr. White has stated; that in all probability the quantity of gas from *resin* will in practice not exceed eight or nine feet per pound, that is, about 1000 feet per cwt.; that the gas after being purified will be of specific gravity not much beyond .600; the condensation by chlorine not beyond eight or nine per cent.; a foot of it not giving more than the light of from 2½ to 3 candles. If so, then, when that gas is mixed with about its own volume of water-gas. no doubt the quantity will be increased, but to the *serious deterioration of the illuminating power.* That of the water may be said to be *nil*, or a very near approach to it; consequently the reduction in the illuminating power of the other will be just in proportion to the addition; indeed, were it not that the water-gas adds to the quantity, and, perhaps, from the peculiar mode of generating it, also adds to the specific gravity, of which, as an indication of the value, some have a high opinion, I strongly suspect that Mr. White had better dispense with it altogether, and thus save the trouble and expense of manufacturing, and of storing and transmitting to the public an article which, for the purpose of illumination, is, as now generated, absolutely useless.

NEW MODE OF EFFECTING THE LIQUEFACTION OF CARBONIC ACID.

BY M. BERTHELOT.

M. **Berthelot** has recently made known a very simple and ingenious process by which the phenomenon of the liquefaction of a gas may be exhibited to an audience without the slightest danger. A piece of barometer tube is sealed at one end and drawn out at the other, and then filled with mercury in the usual manner. The tube being filled is placed horizontally in a water-bath, and the open point is passed through a perforated cork fixed into a larger tube communicating with an apparatus in which the gas to be used is generated. The heat causing the expansion of the mercury, some of it flows out of the tube. When it has acquired exactly the temperature of 122° Fahr., and has been kept at this temperature for some time, it is allowed to cool. The mercury contracts, and some of the gas, equal in volume to the mercury which had escaped, enters the tube. When it is completely cold the tube is removed, and the point sealed in the lamp.

In showing the liquefaction of the gas the tube is to be heated in the water-bath to the exact temperature of 138° Fahr. The gas compressed by the expansion of the mercury soon liquefies, and again assumes the gaseous state as the tube cools. The change from the gaseous to the liquid state is easily shown to an audience by the aid of a gas microscope, and the same tube may be used for an indefinite number of times.

M. Berthelot proposes, by the application of his process, to attempt the liquefaction of oxygen and hydrogen gases, carbonic oxide, binoxide of nitrogen, and marsh gas, which have not hitherto been liquefied. He has already made numerous experiments, which have hitherto proved unsuccessful.

A tube, the exterior diameter of which was 1.574 inch, and its interior diameter .118 inch, in which oxygen was compressed, gave way under a pressure which was estimated at 780 atmospheres. The author still continues his interesting researches, and we hope that he will arrive at some positive results, unless, according to Faraday's opinion, pressure, even aided by intense cold, is insufficient for the liquefaction of the gases above alluded to.—*Journal de Pharmacie.*

ON ARIDIUM, A PROBABLY NEW METAL.

BY M. ULLGREN.

WALLMARK recently communicated to the Academy of Sciences of Stockholm, a paper by M. Ullgren, of the Technical Institution, in which he describes a probably new metal, which occurs in the chrome iron of Röros, and in some other iron ores. This metal presents in its oxides considerable resemblance to iron, and is, therefore, for the present, called *Aridium*, from Ἄρης *Mars*, and εἶδος *a form* or *sort.*

In endeavouring to detect the presence of phosphorus in the bar-iron of the Oernstolsos iron ores, the author found that the solution of iron which he obtained reacted in many respects different to that of iron only ; and subsequently on examining chrome iron from Röros he found that the oxide of iron obtained from it reacted like that in the solution alluded to.

1. It dissolves in muriatic acid without disengaging chlorine, and leaves, on evaporation, by a gentle heat, an uncrystallizable deliquescent residue of a lemon colour. It differs in this respect from oxide of iron and oxide of cerium.

2. With sulphuric acid it yields a compound which dissolves in water without colour, thus differing from sulphate of iron at least in the presence of free acid. On ignition this sulphate yielded a reddish brown powder, which appeared under the microscope as small indistinct transparent crystals of a beautiful red colour.

3. When sulphuretted hydrogen was passed through the solution of this metal, the oxide was reduced to protoxide. After expelling the excess of sulphuretted hydrogen, it was thrown down of a greyish white colour by ammonia ; but this precipitate immediately became light brown without first becoming green, as is the case with the protoxide of iron.

4. This solution of protoxide is precipitated from the fresh boiled solution by ferrocyanide of potassium of a pale, whitish-green colour, which gradually becomes dark-green, and then blueish. When excess of ammonia is poured over it, the precipitate becomes of a beautiful blue, which colour gradually changes to greyish blue.

5. A solution of the protoxide of aridium is not precipitated by an infusion of galls. Acetate of soda produces a pale-red precipitate.

6. A solution of the peroxide of aridium does not become black by an infusion of galls, but intensely indigo blue, and upon the addition of acetate of soda, a brownish-violet precipitate is formed. Neither iron nor cerium behaves thus.

7. A solution of peroxide of aridium is coloured dark-blue by ferrocyanide of potassium ; an excess of the latter, however, changes the colour to a dirty blueish-green. Cerium gives a white precipitate.

8. A solution of peroxide of aridium assumes on the addition of ferrocyanide of potassium a blueish green colour, and in the dark a similarly coloured precipitate falls down in an hour. A solution of peroxide of iron becomes brown ; cerium is not precipitated.

9. A solution of the peroxide of aridium is not precipitated like a solution of iron, of a deep blood-red, by acetate of soda, but dark yellowish-brown.

10. A solution of peroxide of aridium is coloured deep-red by sulpho-

cyanide of potassium, like a solution of oxide of iron; with the latter, however, the colour disappears upon the addition of an excess of acid, but not so with the first.

11. A solution of peroxide of aridium yields with carbonate of soda, a light, brownish-yellow precipitate, and also a yellow solution; the solution of oxide of iron, however, yields a brownish-red precipitate, which dissolves with a red colour.

12. Solutions of peroxide of aridium are precipitated by the alkaline sulphurets of a blackish green colour. The solution remains green for a long time. The precipitate is readily dissolved by dilute nitric acid.

13. Solutions of peroxide of aridium yield with caustic alkalies precipitates nearly the same as those of oxide of iron; the precipitates are however, of a deeper yellow colour, and, after drying, more earthy. After ignition, the powder is greyish-brown, not so red as oxide of iron.

14. Before the blow-pipe, small quantities of oxide of aridium, mixed with borax, yield on the platina wire in the outer flame, a yellow bead, which becomes colourless on cooling. By stronger saturation, the beads are brownish-red; on cooling, yellow and opalescent, but like those of cerium.

In the inner flame, the bead was light-green, in small quantities, and colourless when cold; in larger quantities, it was beautifully green while hot, but when cold the purity of the colour diminished.

With microcosmic salt and by stronger saturation, the bead was in the outer flame dark red, and perfectly colourless when cold. In the inner flame the bead, when slightly saturated, was without colour; when strongly saturated it was slightly brown when cold.

Fused with soda and charcoal, the mixture formed first a glassy mass, and was then absorbed by the charcoal, but upon being triturated in the mortar and washed did not furnish any metallic particles. Heated with soda on the platinum-wire, it became a reddish-brown transparent glass, which, when cold, was spotted with brown. In the inner flame also a glass was obtained, which remained colourless, and in which no precipitate could be perceived. The bead being now again heated in the outer flame, the former re-action re-appeared.—*Pharm. Central Blatt.*, 1850, No. xxvii., p. 417.

CAMELINA SATIVA, OR COMMON GOLD OF PLEASURE.

BY JOHN RYAN, M.D.

This is a cruciferous plant, usually enumerated among our indigenous plants, though as it does not long propagate itself with us spontaneously, and is found only in cultivated fields, chiefly among flax, with whose seeds it is often introduced from abroad, there is good ground for presuming that it is not in reality a native. Sir James Edward Smith observes of it, "that the ridiculously pompous English name seems a satire on the articles of which it is composed, as yielding nothing but disappointment."

In some parts of the world it is cultivated for its stems, which yield a fibre applicable for spinning and for its oleiferous seeds. Merat and De Lens say that it is cultivated for these purposes in Flanders.

The seeds are sometimes called *sesamum seeds* (*semina sesami vulgaris*); but they must not be confounded with the genuine *sesamum* or *teel seeds*, the produce of *sesamum orientale*.

Mr. William Taylor, F. L. S., has recently drawn the attention of agriculturists and others to the camelina sativa as an oil plant, adapted for feeding cattle, and for other purposes. He says that the soils best adapted for its cultivation are those of a light nature; but a crop will never fail on land of the most inferior description. It has been found to flourish this year on barren sandy soils, where no other vegetable would grow; and, independent of the long drought, the plants have grown most luxuriously, yielding a large and certain crop. When grown upon land that has been long in tillage, and well-farmed, the crop will be most abundant. The best time for putting in the seed is as early as possible in the spring months—say from the middle of March or the middle of April to June, and for Autumn sowing in August; and the quantity per acre required, 10lbs., and may be either drilled or broad-cast; but the drill method should be preferred. If drilled, the rows must be twelve inches apart. As soon as the plants have grown five or six inches high, a hand or horse-hoe may be used to cut up the weeds between the rows, and no further culture nor expense is required.

If sown early, two crops may frequently be obtained in one year, as it is fit for harvesting in three months after the plant makes its appearance; or another important advantage may be obtained: if the seed is sown early in March, the crop will be ready to harvest the beginning of July, and the land fallowed for wheat or spring corn; also, where barley or small seeds cannot be sown sufficiently early, this may be put in with great success. It is a plant that may be cultivated after any corn crops, without doing the least injury to the land, and may be sown with all sorts of clover; the leaves of the gold of pleasure being particularly small, afford an uninterrupted growth to any plant beneath it, and the crop being removed early, the clover has time to well establish itself.

The grower of this invaluable production is, in all seasons, secure of his crop; inasmuch as it is not subject to damage by spring frosts, heavy rains, and drought, and, above all, the ravages of insects, more particularly the cabbage-plant louse (aphis brassica), which so frequently destroys rape, turnips, and others belonging to the cruciferæ order, when coming into blossom. The seed is ripe as soon as the pods change from a green to a gold colour. Care must then be taken to cut it before it becomes too ripe, or much seed may be lost. When cut with the sickle, it is bound up in sheaves, and shocked in the same manner as wheat; and, the process of ripening completed, it is stacked, or put in a barn, and thrashed out like other corn. The expense of these crops cannot be very great, either in the preparation and culture of the land, or in the management in securing the produce afterwards; but, when grown with care, and in a good season, the produce will mostly be very abundant, as high as thirty-two bushels and upwards the acre. The cultivation of this plant for the seed would amply repay the farmer. An abundance of chaff would be produced, which would be of infinite service for horses or for manure; but, in a grazing country like England, were vast sums are annually expended for foreign oil-cake, the gold of pleasure will soon be found an excellent substitute under manufacture, and consequently a grower would find a good remuneration in cultivating the seed.

The plant may be considered a valuable production of the earth; a fine oil is produced for burning in lamps, in the manufacture of woollen goods, in the manufacture of soaps, for lubricating machinery, and for painters. The oil-cake has been found highly nutritious in the fattening of oxen and sheep, as it contains a great portion of mucilage and nitrogeneous matter, which, combined together, are found very beneficial in developing fat and lean.

From the experiments above related, it is abundantly proved that it does not suffer from the severest frosts, its foliage not being injured; it is not infested by insects, nor does it exhaust the soil. The gold of pleasure has been cultivated by several practical agriculturists, who highly approve of the new plant. For all these reasons, it is to be hoped that every farmer will avail himself of this valuable discovery as a remunerating rotation crop.

Mr. Taylor adds, "that one acre, cultivated with these plants, yields thirty-two bushels of seed, from which 540lbs. of oil are obtained. So that the camelina seems to exceed the flax in its produce of seed, oil, and cake per acre." The following statement has also been published:—

ANALYSIS OF LINSEED AND OF THE SEED OF GOLD OF PLEASURE.

Linseed.

The mucilage obtained by digesting in water consists of—

A peculiar gum	82.59
Water	10.30
Inorganic matter	7.11
	100.00

The elementary analysis gives:—

Carbon	36.30
Nitrogen	5.27
Hydrogen	5.65
Oxygen	52.78
	100.00

Gold of Pleasure.

100 parts of seed gave :—

Mucilage	83.75
Water	10.25
Ashes	6.00
	100.00

The mucilage consists of :—

Soluble gum	61.75
Insoluble gum	22.00
	83.75

The elementary analysis of the mucilage gave :—

Carbon	36.30
Nitrogen	12.27
Hydrogen	4.65
Oxygen	46.78
	100.00

The seed is extremely rich in nutriment. I know of no seed superior to it for feeding cattle. The oil obtained by expression is sweet and excellent, especially for purposes of illumination. From the very small quantity of inorganic matter in the seed, it will be evident that the seed-cake must be of a very nutritious character, being merely the seed deprived of a portion of its water and oily matter.

Royal Polytechnic Institution, April 24th, 1845.

[We confess that we do not understand this "Analysis." It would appear from it that these seeds contain neither cellulose nor protein (albuminous) compounds, and that the "mucilage" is a nitrogenous body! We have examined some of the oil obtained from the seeds of the camelina sativa, and which has been recently sent to several medical men by Mr. Taylor, under the belief that it possesses valuable medicinal properties. It is of a yellow colour, and smells something like linseed oil. Finding it beneficial in relieving the incessant cough and reaching of a cat, Mr. Taylor has extended its use to the human subject, and states that it has done "a world of good," and cured several persons afflicted with diseased lungs and asthma!—Ed.]

NOTICE OF THE CLOTH TREE (*BROUSSONETIA PAPYRIFERA*) OF THE SOUTH SEA ISLANDS.

From Captain Beechy's Narrative of a Voyage to the Pacific and Behring's Strait, in the Years 1825, 1826, 1827, *and* 1828. Lond. 1831, vol. i., p. 131.

THE Cloth Tree is pre-eminently useful, and here [at Pitcairn's Island,] as in all places in the South Seas, where it grows, supplies the natives with clothing. The manner in which the cloth is manufactured has been frequently described, and needs no repetition. There is, however, a fashion in the beater, some preferring a broad, others a very closely ribbed garment; for which purpose they have several of these instruments, with large and small grooves. If the cloth is required to be brown, the inner bark, of which the cloth is made, is wrapped in banana leaves [*Musa sapientum*] and put aside for about four days; it is then beaten into a thick doughy substance, and again left till fermentation is about to take place, when it is taken out and finally beaten into a garment, both lengthwise and across. The colour thus produced is of a deep reddish brown hue. The pieces are generally sufficiently large to wrap round the whole body, but they are sometimes divided.

MEDICAL USES OF SLUGS, &c.

DISCARDED from the service of the physician, a few Mollusca have found a resting-place in the Materia Medica of the common people, who inherit to the full their wise ancestors' faith in their virtues, which are enhanced by some superstitious traditions and observances. Slugs and snails were anciently, and are to this day, a popular remedy in consumptive complaints. They are sometimes made into a mucilaginous broth, sometimes swallowed in a raw state, and sometimes the shell is pricked through with a large pin to enable the patient to suck the oozing liquor. You may see considerable quantities of *Helix pomatia* and *aspersa* sold in Covent Garden market for this purpose; and still greater quantities are sold in all the large continental cities. In the Isle of Bourbon, the *Navicella elliptica* is commonly used to make a soup for the sick; and in the same and adjacent islands the animal of *Melania amurula*, which is very bitter, passes for an excellent remedy in the dropsy. The *piedra de las ojos*, which are merely worn fragments of shells, are considered in some parts of South America as the most extraordinary production of their coasts, being, in the philosophy of the natives, both a stone and an animal. These fragments are from one to four lines in diameter, with a plain and a convex surface, and when excited by lemon juice move in proportion as the carbonic acid is disengaged. Placed in the eye, the pretended animal turns on itself, and expels every other foreign substance that may have been accidentally introduced. At the salt works of Araya, and at the village of Maniquares, they were offered to Humboldt and his fellow-traveller by hundreds, and the natives were not only earnest to show them the experiment of the lemon juice, but wished to put sand into their eyes that they might themselves try the efficacy of the remedy. The same custom and superstition is said to prevail in Guernsey; and in the olden time did prevail in the Highlands of Scotland. The Rev. John Frazer, writing of the year 1702, says:—"Snail-stones are much commended for the eyes; and I'm confident their cooling vertue is prevalent against pains bred by a hott cause: their origine is thus, some excrementitious parts avoided by these creatures, condensed by the circumjacent air, and turned to a round figure by the frequent turning; but this is observable, that some of them, speciallye snaile-stones, has the exact figure of the snail."—*Johnston's Introduction to Conchology; or, Elements of the Natural History of Molluscous Animals.*

ON THE REDUCING EFFECT OF SODA IN BLOWPIPE EXPERIMENTS.

BY DR. R. WAGNER.

THE formation of cyanide of potassium in furnaces, Delbruck's experiments on the formation of cyanogen, and the preparation of ferrocyanide of potassium by heating strong bases with charcoal in contact with the air, led the author to suspect that an alkaline cyanide might be formed when soda is heated in the blowpipe flame, and that, in this way, soda might have a reducing influence. If one or two grammes of soda be fused for some time in charcoal, until the mass has been absorbed by the charcoal, undoubted traces of cyanogen are detectable in the latter. When larger quantities are operated on by the glassblower's lamp, the fused mass decomposed by diluted sulphuric acid and submitted to distillation, the cyanogen can be detected in the distilled liquor by means of sulphuret of ammonium and chloride of iron.—*Journ. für Prakt. Chem.*, Bd. 49, S. 191, and *Central Blatt.*

ON THE AIR AND WATER IN TOWNS, AND THE ACTION OF POROUS STRATA ON WATER AND ORGANIC MATTER.

BY DR. R. A. SMITH.

IT is a matter of great importance to find from what source it is best to obtain water for large towns, and how it is to be collected. To these points Dr. Smith particularly directs attention. Regarding the conditions of many springs, which never become muddy, but possess a constant brilliancy and a very equal temperature at all seasons of the year, the author thinks that there is a purifying and cooling action going on beneath. The surface-water from the same place, even if filtered, has not the same brilliancy; it has not the same freedom from organic matter, neither is it equally charged with carbonic acid or oxygen gas,—there are other influences, therefore, at work. The rain which falls has not the purity, although it comes directly from the clouds; it may even be wanting in cleanness, as is often the case. Springs rise through a great extent of soil, and collect a considerable amount of inorganic salts; and it is shown by Dr. Smith that their purity is due entirely to the power of the soil to separate all organic matter, and at the same time to compel the mixture of carbonic acid and oxygen. The amount of organic matter removed in this way is surprising, and it is a most important and valuable property of the soil. The change even takes place close to cesspools and sewers; at a very short distance from the most offensive organic matter there may be found water having little or none in it. As an agent for purifying towns, this oxidation of organic matter is the most extraordinary, and we find the soil of towns, which have been inhabited for centuries, still possessing this remarkable power. St. Paul's Churchyard may be looked upon as one of the oldest parts of London, and the water from the wells around it is remarkably pure, and the drainage of the soil is such that there is very little of any salts of nitric acid in it. "If the soil," says Dr. Smith, "has such a power to decompose by oxidation, we want to know how it gets so much of its oxygen. We must, however, look to the air as the only source, and see how it can come from it. When water becomes deprived of oxygen, it very soon takes it up again,—as may be proved by experiment. This shows us that as fast as the oxygen is consumed by the organic matter it receives a fresh portion, conveyed to it by the porous soil." Several experiments of the following character were given, to show the filtering power of the soil. A solution of peaty matter was made in ammonia; the solution was very dark, so that some colour was perceived through a film of only the twentieth of an inch in thickness. This was filtered through sand, and came out perfectly clear and colourless. Organic matter dissolved in oil of vitriol was separated from it by a thickness of stratum of only four inches. A bottle of porter was by the same process deprived of nearly all its colour. The material of which this filter is made is of little importance. One of the best, according to Dr. Smith, as far as clearing the water is concerned, being of steel filings,—oxide of iron, oxide of manganese, and powdered bricks all answering equally well. This shows that the separation of the organic matter is due to some peculiar attraction of the surfaces of the porous mass presented to the fluid.—*Report of the British Association, Athenæum.*

SUGAR REFINING.

House of Commons, August 14th.

Mr. THORNELY asked whether the attention of the Government had been called to a mode of refining sugar in which lead was made use of; and, if so, whether any investigation had been made into the subject?—and, whether there was any objection to lay the results on the table?

The CHANCELLOR of the EXCHEQUER said that an inquiry had been made into the subject, it having been represented that, by the process in question, a quantity of lead must remain in the sugar refined, and be productive, of course, of very deleterious effects. Three chemists of eminence had analyzed the sugar so refined, and found that no lead remained in the sugar; but they were of opinion that considerable lead did remain in the treacle, the result of the refining. The inventor, however, who was supported by several chemists, disputed this opinion, and, as the best test he could give of his conviction to the contrary, offered that he and his family would eat any amount of treacle that might be reasonably proposed for their consumption. (A laugh.) However, the clearest way would be for the papers on the subject, which he held in his hand, to be laid before the House, and he would at once move that they be printed accordingly.—Ordered.

OBSERVATIONS ON THE POISONOUS QUALITIES OF SULPHITE OF LEAD.

BY DRS. GREGORY AND CHRISTISON.

DR. GREGORY stated, that he had made experiments on the sulphite of lead formed in Dr. Scoffern's process for purifying sugar. He admitted that an infinitely small proportion might still remain in the sugar, but that he considered it quite innocuous. He had indeed fed rabbits and dogs with food which had been united with this sulphite of lead, and the result was that they thrived amazingly, showing no symptom of any of the known effects of lead. Dr. Gregory also remarked, that in testing sugar for lead with the hydro-sulphuret of ammonia, iron was often mistaken for the former metal.

Dr. Christison contended that we had no evidence that the sulphite of lead was innocuous. It was true, that, in cases of poisoning by carbonate of lead, sulphuric acid was administered to convert it into the comparatively insoluble sulphate; but this was a case widely different from the slow accumulation of lead upon the system. Dr. Christison adduced some examples of exceedingly small doses of lead being taken in water for more than twelve months before its evil effects became apparent. He, therefore, thought it yet remained to be proved that the sulphite of lead was without action on the system, since we know nothing of the influence of the solvents it would meet with in the system, or of the influences of vital action. Rabbits, he was prepared to say, should be entirely rejected in these inquiries, since he had found that they were not affected by many poisons. Dogs and cats were the only animals which could, from their internal structure, be regarded as the representatives of the human system in these investigations.—*Report of the British Association, Athenæum.*

POISONING BY CHLORIDE OF ZINC.

A PAPER, by Dr. Letheby, was lately read at the Medico-Chirurgical Society, on a case of poisoning by chloride of zinc, which occurred in August, 1849. The subject was a little girl, aged fifteen months, at Redingfield, in Suffolk. A bottle of Sir William Burnett's fluid had been supplied to the mother on account of the prevalence of fever in the house, and she, not knowing its deleterious nature, had given some of it to the child. No relief could be given; the throat was swollen and painful, a frothy matter was vomited, coma ensued, with impeded respiration and failing of the pulse. Ten hours after the attack the child died. The author states, "The stomach felt hard and leathery, and contained an ounce and a half of fluid resembling curds and whey. Its inner surface was corrugated, opaque, and tinged of a dark leaden hue." "The interior of the stomach was slightly acid to litmus-paper, and on digesting the organ in distilled water, the liquid obtained gave white precipitates with prussiate of potash, carbonate of soda, sulphuretted hydrogen, and acid nitrate of silver, no precipitate being obtained on the addition of a soluble salt of baryta." "The fluid in the possession of the mother had a density of 1600, was slightly acid, and contained 52 per cent. of chloride of zinc." Experiments made with this liquid to determine its leading chemical and physiological characters, shewed, 1st, That the chloride of zinc is distinguished from the other salts of the metal by its quick and firm coagulating action on liquid albumen, and on the delicate tissues of the body. 2d. That a solution of chloride of zinc exerts a two-fold action on the living animal economy. Its first effect is that of an irritant and caustic, coagulating the tissues, causing pain, and almost instantaneous vomiting. Its second effects are of a constitutional nature, accelerated pulse, paralysis of the voluntary muscles, cold surface, dilated pupil, and lastly coma.

POISONING BY ARSENIC AND CROTON OIL.

WILLIAM CHADWICK, aged twenty-three, was tried at the Staffordshire summer assizes for the murder of Samuel Tunnicliffe, aged seventy, in February last. Mr. Smith, assistant to Mrs. Baker, deposed that he remembered the prisoner coming to the shop for twopennyworth of arsenic for rats and mice (Jan. 24). It was refused. Mr. Greaves (apprentice of a Druggist at Ashbourne), who was in the shop at the time, hearing the conversation, told him he would let him have the arsenic, and they went away together. Prisoner had previously been refused by several other Chemists. About the same time he bought sixpennyworth of sugar of lead.

Mr. Cocker, manager of Mrs. Baker's shop, deposed, that on the 26th of January, the prisoner's wife applied to him for some croton oil for cattle. After strict inquiry witness gave her threepennyworth (sixty drops), but insisted on mixing it with two ounces of linseed oil as a precaution. She at first objected, but rather than go without it she took it mixed.

About a week afterwards the old man died, having been ill during the interval, and attended by Mr. Hall, surgeon, who did not at the time recognise the effects of poison. Deceased was seen by a neighbour immediately after his death, with a pen in his hand, and before him a deed of gift, making over a freehold house and other property to the prisoner. This had been prepared a short time before by the prisoner's instructions, and two days after the funeral he demanded the key of the house of the person in whose charge the deceased had left it.

These circumstances led to suspicion, and a chain of evidence was soon developed. The body was exhumed, and examined by Mr. Heaton, surgeon, of Leak, who found the mucous membrane of the stomach partially inflamed; the large intestines were so, especially at the lower part, where he found a powder. This, with the contents of the stomach, he conveyed to Professor Shaw, who found the powder to be arsenic. He also found arsenic in the fluid contents of the stomach and intestines, and estimated the quantity at from eight to ten grains, exclusive of the powder, which was about three grains. It afterwards transpired that arsenic had been given to the deceased several times during his illness of a week's duration; first in elder-wine, afterwards in biscuits and in coffee. Between the doses of arsenic some of the croton oil was administered, which, no doubt, masked the symptoms. We have thought it right to report the leading facts of this case, because it shows the caution generally observed by Chemists in the sale of poisons, several having refused to sell arsenic, and the croton oil having been refused unless properly mixed as cattle medicine. It was only by the most determined and systematic perseverance on the part of the prisoner and his wife that the means of destruction were obtained, and so artfully was the plot managed, that it might never have been discovered if collateral circumstances had not occasioned suspicion. The prisoner was found guilty; but his wife escaped, although he endeavoured to save himself by imputing the crime to her.

PENALTIES FOR THE ADULTERATION OF BEER.

By 56 Geo. III., c. 58, s. 2, it is enacted, That if any brewer or brewers of, or dealer or dealers in, or retailer or retailers of beer, shall receive or take into, or have in his, her, or their custody or possession, or make or use in brewing, or mix with or put into any worts or beer, any liquor, extract, calx, or other material or preparation for the purpose of darkening the colour of worts or beer, or any liquor, extract, calx, or other material or preparation such as has been heretofore or as shall hereafter be made use of for or in the darkening of the colour of worts or beer other than brown malt, ground or unground, as commonly used in brewing, or shall receive or take into, or have in his, her, or their custody or possession, or shall use or mix with or put into any worts or beer any molasses, honey, liquorice, vitriol, quassia, coculus Indiæ, grains of Paradise, Guinea pepper, or any extract or preparation of molasses, honey, liquorice, vitriol, quassia, coculus Indiæ, grains of Paradise, Guinea pepper or opium respectively, or any article or preparation whatsoever for, or as a substitute for malt and hops; all such liquor, extract, calx, molasses, honey, vitriol, quassia, coculus Indiæ, grains of Paradise, Guinea pepper, opium, extract, article and preparation as aforesaid, and also the said worts and beer respectively shall be forfeited, together with the casks, vessels, or other packages containing the same, and shall and may be seized by any officer or officers of excise, and such brewer or brewers of, dealer or dealers in, or retailer or retailers of beer, so offending as aforesaid, shall for each and every such offence forfeit and lose the sum of £200.

THE SALE OF DRUGS TO BREWERS.

By the 3rd section of the same act, a penalty of £500 is imposed upon any Chemist, Druggist, or other person whatever selling the foregoing articles to any licensed brewer, dealer in or retailer of beer.—These penalties are extended to beer retailers under 1 W. IV., c. 64, and 4 & 5 W. IV., c. 85, in which acts also there are special provisions against adulteration applicable to that particular class of traders. The provisions applicable to Ireland are 7 & 8 Geo. IV., c. 52, s. 64 and 65.

INJUSTICE TO THE WIDOW OF A CHEMIST AND DRUGGIST.

Mr. W. G. Rutland, a Licentiate of Apothecaries' Hall and Member of the Royal College of Surgeons, was charged at Guildhall, on Tuesday, the 20th of August, with appropriating the drugs of his employer to his own use. Mrs. Dyte, widow of the late Mr. Dyte, Chemist and Druggist, in the Minories, was the prosecutrix, having engaged the defendant after the death of her husband, to carry on the business for her benefit, at a salary of £52 per annum. It was proved that defendant had, contrary to agreement, practised on his own account in several cases, and dispensed his prescriptions with drugs the property of his employer. "The chief clerk informed the magistrate that, according to Act of Parliament, the widow of Mr. Dyte had been guilty of fraud in carrying on the business of a *Chemist and Druggist*, or that of a *Surgeon*, as it was necessary for a person to be a Licentiate to practise as an *Apothecary* (!) Prisoner had made out the bills in his own name, and further had been engaged to compound medicines, and, therefore, they could not sustain a charge of felony for using the drugs in making up his own prescriptions. The prosecutrix in this case was carrying on an illegal trade, and therefore could not recover from the prisoner, who appears to have practised on his own account." He was therefore discharged.

[The *rationale* of this verdict is unintelligible. If it be illegal for the widow of an Apothecary or Chemist to engage a *qualified* assistant to conduct the business of her late husband, then every Apothecary or Chemist, having no property to leave except his stock and goodwill, may be certain that at his decease his widow will be destitute. And if, in such a case, a qualified medical practitioner may legally rob a widow of her property, because the said widow is not legally qualified to carry on the business in *propriâ persona*, then we may infer that two blacks make a white, which is absurd.—Ed.]

THE EPIDEMIOLOGICAL SOCIETY.

A meeting was held on Tuesday, the 30th of July, at the Hanover Square Rooms, to complete the establishment of this Society. Lord Ashley took the chair, and commenced his address by an allusion to the fact that upwards of 12,000 persons die annually of epidemic diseases in the metropolis. The object of the Institution was, he observed, to investigate the conditions of the prevalence of such diseases with the view of adopting the best means of prevention, an object of the utmost importance to the welfare of mankind, not only in its medical but also in its moral and social bearing. After enumerating the various causes supposed to promote epidemics, such as bad drainage and ventilation, deficient supply of water, overcrowding of dwellings, &c., his Lordship described the influence which the new Society would exercise by affording a focus of statistical information, and an arena for the application of science and experience to the desired object. He hoped the Society would proceed in a right spirit, not for the sake of eulogy, but desiring with one heart and mind to effect a true and lasting benefit on the human race.

Resolutions were unanimously passed forming the Society and electing the President (Dr. Babington), also Vice-Presidents and Council.

The meeting, which was well attended, did not consist entirely of medical practitioners, it being one of the objects of the Society to enlist in the investigation persons of all classes who are likely to afford assistance. The public at large are invited to become members, in order to extend the interest in the Society, the pecuniary resources, and the means of collecting information; but the officers consist chiefly of medical men, with a few whose position or experience in collateral branches of science may enable them to assist in the work. Among these we may mention Mr. Percival, whose experience in the veterinary profession will be valuable, as it is well known that epidemics frequently prevail among cattle, and it is desirable to ascertain what relation, if any, exists between such epidemics and those which affect the human species.

We trust the Society will prosper. In order to ensure this result, the united co-operation of the entire profession is desirable, as it is only by the accumulation of statistics from all quarters, and collected under various circumstances, that correct conclusions can be deduced.

NOTICES OF BOOKS.

ON THE ACTION UPON THE GALVANOMETER BY ARRANGEMENTS OF COLOURED LIQUIDS IN A U TUBE. As observed by G. MACKRELL, J. W. GANN, and T. POLLOCK.

AN elaborate series of experiments of an interesting kind to those who study electricity. We wish the authors had more clearly stated, in the beginning, their mode of manipulating. Mr. Pollock, a Member of the Pharmaceutical Society, is already favourably known to the scientific world by his papers in the *Transactions of the Electrical Society.*

REVIEW OF THE REPORT OF THE GENERAL BOARD OF HEALTH, *on the Supply of Water to the Metropolis, addressed to the Directors of the London (Watford) Spring Water Company.* By SAMUEL COLLETT HOMERSHAM, C.E.

THIS review has evidently for its main object the advocacy of the project on behalf of which the author is professionally engaged. Its chief merit consists in the forcible manner in which it exposes the fallacies contained in the Report of the Board of Health—a report which is not, as the term would imply, an impartial statement of facts, but a distortion of facts to suit a preconceived theory. The clandestine mode in which the "evidence" adduced in the Report of the Board of Health was collected, cooked, cut, and garbled, is pointed out by Mr. Homersham. There are several matters connected with the chemical part of the question to which we might have adverted, but we purposely curtailed our previous notice of the Report, lest our readers should be tired of the subject, and for the same reason we now leave the Report to the tender mercies of Mr. Homersham and common sense.

ORATIO HARVEIANA IN ÆDIBUS COLLEGII REGALIS MEDICORUM HABITA. Die Junii xxiv., MDCCCL. A JACOBO ARTHURO WILSON, M.D.

THE COMMERCIAL HAND-BOOK OF CHEMICAL ANALYSIS; *or Practical Instructions for the Determination of the Intrinsic or Commercial Value of Substances used in Manufactures, in Trades, and in the Arts.* By A. NORMANDY. London: George Knight and Sons, Foster Lane.

"The object of the present book is," as the author states in the preface, "to indicate the various falsifications or the impurities which naturally, accidentally, or intentionally, may contaminate the various articles met with in commerce, and to enable the manufacturer, the miner, the trader, and the public generally to detect the nature and amount of these sophistications and impurities, or, in other words, to ascertain the real or intrinsic value of such articles." The subject is a comprehensive and important one, and, if successfully treated, it would afford a work of very great value; but the author, to do justice to the subject, must possess extensive practical experience, not only in chemical analysis, but also in the natural and commercial histories and manufactures of the substances treated of. There are few men qualified for such a task, and no one that we know of, either in this country or abroad, who has fully and satisfactorily accomplished it.

In looking over the work before us we find much useful matter for the Pharmaceutical Chemist, especially in the articles on alkalimetry, chlorimetry, and the examination of ores, of coffee, bread, &c., and if we regret the omission of a great number of substances, the examination of which is rendered imperative by the frequent occurrence of impurity or adulteration, we are only thereby reminded of the difficulty of rendering such a work complete. Thus, for instance, finding assafœtida, benzoin, and rhubarb, among the substances treated of, we are disappointed on seeking in vain for aloes, jalap, scammony, and a host of other substances equally important in their applications, and not less liable to adulteration. We think, however, that the author would perhaps have acted judiciously had he omitted entirely this class of substances, and confined his notice to those with reference to which he has had more practical experience. The statement that powdered rhubarb "is often mixed with gamboge," unaccompanied by any notice of the substances with which it really is mixed, is rather calculated to lead away from, than to aid in, the detection of adulteration. In this and other cases, there is evidence of the appeal having been made to foreign sources of information rather than to actual experience in the commerce of this country. Pure oxide of zinc is described as having "a silver white colour of great brilliancy, so much so, that the best white lead looks murky by the side of it," and the description which is given of the adulterations of this substance, indicate that the author was unacquainted with the characters of the commercial oxide of zinc of this country. Equally imperfect is the account given of the mode of detecting adulterations in castor oil and balsam of copaiba. We admit that, with reference to some of these substances, the means hitherto relied upon for the detection of adulterations have been proved to be inefficient, while little has been done to supply new and better means, but it might at least be expected, that an author in undertaking to write on such subjects, would make himself acquainted with the results of modern investigations. A reference to the pages of this Journal, and of some of our approved works on Materia Medica, would have supplied much more valuable information with reference to the adulterations practised in this country, than the foreign authorities which appear to have been principally consulted.

IODOGNOSIE, *ou Monographie Chimique, Medicale et Pharmaceutique des Iodiques en General.* Par DORVAULT.

THE BATH WATERS; *their Uses and Effects in the Cure and Relief of various Chronic Diseases.* By JAMES TUNSTALL, M.D., &c., &c. London: John Churchill. 8vo., pp. 144.

THIS book contains practical instructions useful to those who visit Bath for the benefit of their health. The analysis of the water has already been published in this Journal (vol. iii). The author gives a statistical report of the cases cured or relieved by the use of the Bath Waters, with a table showing the relative proportion of success in each disorder.

TO CORRESPONDENTS.

J. S. C., (Great Yarmouth).—(1.) In comparing the capacity of vessels or tubes, it is necessary to compare not the diameters but the sectional areas of the vessels. Mr. Paget has ascertained that there is sometimes a slight increase, and sometimes a slight decrease, in the sectional areas of the branches of the blood-vessels as compared with the trunk. — (2.) The "Sturm" referred to may perhaps be the J. C. Sturm mentioned by Haller (*Disp. Anatom. Select.*, vol. iv., p. 163) or the author of a *Diss. visionis*—a work we have never seen.

A Pharmaceutist (Southampton).—In preparing tinctures by percolation, the last portion may be displaced by means of water.

Libra.—In the case alluded to, diluted acetic acid is most likely intended although the term properly denotes the strong acid.

Mr. Heath (Liverpool).—There are several processes for preserving milk. The most common one consists in evaporating it to the consistence of a thin cream and adding sugar, air being excluded, and the vessel hermetically sealed.

P.P.—In making beer and cyder, the acetous fermentation is prevented by excluding the air at the proper time; but having no experience in the process, we are unable to give explicit instructions.

A Life Member (Huddersfield) is liable to the tax of 10*s.* 6*d.* a year for using a still, and should apply to an excise officer in his neighbourhood for his licence.

Chemicus (Biggleswade).—(1.) The publication of a paper in a journal does not make it public property in the sense alluded to.—(2.) It would not be right for another person to republish it without quoting his authority.

County C.—(1.) We are obliged by the suggestion, not having seen the case before. — (2.) A Chemist could recover the amount of his bill for medicines dispensed for an Apothecary.

We have also to thank our Correspondent at Ashborn.

X.Y.Z.—See Vol. vii., No. vii.—The minor examination is almost always passed before the major. In a few cases the minor has been dispensed with under particular circumstances.

W. G.—*Harness dye.*—Bruised galls, logwood, each ℥viij.; water four pints, boil for ten minutes, then strain and add sulphate of iron ℥ij.

M.L.H.—Muriate of cobalt is made by dissolving the protoxide in hydrochloric acid. Its preparation from the native ores is a complicated process, the details of which depend upon the kind of ore operated upon.

A. M.P.S.—Olive oil is frequently adulterated on the continent with oil of poppy seed, and we think this was probably the case with the specimen alluded to.

M.P.S.—(1). The work referred to may be got of Messrs. Williams and Norgate, Henrietta Street, Covent Garden.—(2.) *Chrome Ink*, see vol. vi., page 489 of this Journal.—3. Powdered alloys, of which copper and tin are the principal ingredients, are sold for bronze.

Quæro.—(1.) The natural system.—(2). Lindley's *British Flora.*—(3.) The linear magnifying power should be from twenty to forty. A good single microscope may be obtained of Smith or Ross at about the price mentioned. —(4.) Quekett's *Practical Treatise on the Microscope.*

The communication from the Birmingham Pharmaceutical Institution has been received, but was too late for this month.

Several Correspondents would have been answered by post if they had sent their addresses.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Advertisements to Mr. Churchill, Princes Street, Soho.

Other Communications to the Editor (to the care of Mr. Churchill).

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. VI.—OCTOBER 1st, 1850.

THE NINTH SESSION OF THE SCHOOL OF PHARMACY.

THE re-opening of the School of Pharmacy for a new session, usually affords an opportunity for offering a few words of advice and encouragement to Students. On the present occasion we think this is unnecessary, as this number contains a history of the progress of Pharmaceutical education in a neighbouring country, which ought to answer the same purpose. Those who may feel disposed to go more deeply into the subject, with the view of applying the experience of our neighbours to their own cases, are referred to our ADVICE TO STUDENTS, in our number for October, 1847, and also to the number for January, 1848 (Vol. vii., No. 7), which describes the examinations of the Pharmaceutical Society.

PHARMACY IN FRANCE.

IN another part of this number will be found a very interesting report of a commission recently appointed to consider the present state of the Pharmaceutical Schools in France. The importance of this document will be appreciated by every Pharmaceutical Chemist who feels interested in the elevation of his trade to the character of a profession. We see pointed out, in a concise and methodical manner, as the result of experience, the requirements of the Pharmaceutical Chemist, and the means by which alone the proper qualification can be obtained. We see that although this system of education was commenced in France as early as the year 1576, it has not yet arrived at perfection. It has for many years enjoyed, directly or indirectly, the support of the Government. Nevertheless, there is still something to be done—defects exist which require a remedy. The benefit already derived from the methodical study of Pharmacy, and the collateral sciences, has been satisfactorily demonstrated by the experience of more than two centuries, but experience has pointed out further improvements of which the system is susceptible.

In Great Britain, ten years have not elapsed since the Pharmaceutical Chemists came to the determination that they would become an educated body. We have had no assistance from the Government, the profession, or the public. All that we have done has been the result of the spontaneous resolution on the part of the British Chemists to place themselves in a position at least equal, if not superior, to that of their continental neighbours. If we compare what we have achieved in less than ten years under very unfavourable circumstances, with the progress of our brethren in France during more than two centuries, we have surely no cause for discouragement. It is true that our School of Pharmacy is not remunerative; that it is, on the contrary, attended with loss. A similar complaint has been made in France, and although the cause in the latter case has been explained, the fact is undisputed, that even under the auspices of the Government, and with the advantages of legislative support, fluctuations occur;—a period of prosperity is succeeded by a reaction. Similar causes operate in both countries; the dread of a prospective examination causes a large influx of members, the enforcement of the ordeal stops the current. The same desire to evade the rigour of the law pervades the majority of the students, while there are some who voluntarily embrace the full advantages of a superior education, and take a higher position in consequence. The question, "How can I escape the examination?" is translated into all languages—it is indigenous in every climate. There is but one inference to be drawn from this fact, namely, that something more than persuasion is necessary to raise the majority above mediocrity. That which will stimulate the few is inoperative with the many, and some direct advantage must be held out as an inducement to those whose mind's eye is not provided with a telescope to carry their ideas beyond the present moment.

This can only be attained by the intervention of the legislature—by restricting the adoption of a name or title to those who have acquired a corresponding qualification. The conclusions at which the commission have arrived, in the report alluded to, confirm all the statements we have made on the subject since the formation of the Pharmaceutical Society. We have now the benefit of the latest experience of the French Pharmaciens. This experience they have purchased at a great expense, and we obtain it gratis by reading the report. To this report, then, we refer the Members and Associates of the Society, students who are entering on their career, and parents who are about to bring up their sons as Pharmaceutical Chemists.

Next month we intend to offer a few remarks on the State of Pharmacy in Great Britain, and the influence of our School of Pharmacy on the character and prospects of the Society.

THE EXHIBITION OF THE WORKS OF INDUSTRY OF ALL NATIONS.

THE preparations for the great Exhibition are progressing favourably. The prejudice which in some degree prevailed in the first instance appears to be subsiding, and the nature of the undertaking is better understood.

We have ascertained that many manufacturing Chemists in the metropolis and in provincial towns, are preparing to send choice specimens of the articles to the preparation of which they respectively devote especial attention. Importers, brokers, and merchants favourably circumstanced in regard to particular branches of commerce, will also become exhibitors on their own account. As soon as it is known what will be the extent of these spontaneous contributions it will become the duty of the Commissioners in their several departments to prepare lists, properly classified and arranged, of the articles required to fill up the gaps in the series, in order to make the collection complete. There are many commodities or products individually unlikely to excite much interest, which in the aggregrate will form an essential and important part of the Exhibition. It was, therefore, necessary to be prepared with the means of supplying such deficiencies, and for this purpose the assistance of practical men, especially in the wholesale department, was highly desirable.

The subject has been discussed *on change*, with the result which we fully anticipated. A general disposition has been evinced by the wholesale druggists and manufacturers, to contribute to the object in view in such manner as may appear most likely to ensure success. It was difficult at first to decide upon a plan of proceeding which would secure the attainment of the specimens required without inundating the Exhibition with duplicates. This difficulty has been removed by a proposition emanating from the leading members of the wholesale trade, which will place at the disposal of the Commissioners the means of effecting a complete and satisfactory arrangement. The plan proposed is the appointment of a small committee of wholesale druggists and manufacturers to act as the representatives of the body at large. To this committee the Commissioners will furnish information and suggestions, as the work proceeds, and the specimens required will be forwarded as a collective contribution.

Judging from the facilities which exist under the present plan, for an effective combination of theoretical with practical knowledge in the undertaking and the liberal spirit which has been manifested by all parties concerned, there is every reason to anticipate that the result will be creditable to the national character of the Chemical and Pharmaceutical body.

A classified list of vegetable productions has already been prepared by Sir William Hooker, Dr. Lindley, and Dr. Royle, and when we mention among the other Commissioners, the names of Faraday, Brande, Graham, Playfair, Hofmann, Solly, Richard Phillips, Pereira, Forbes and Redwood, no doubt can exist respecting the talent, experience, and impartiality of the tribunal to which the arrangements will be entrusted. Nothing more was required, except the means of obtaining the materials to supply a complete collection, and this object is now secured in the Chemical and Pharmaceutical Department by the liberal and disinterested proposition of the wholesale trade—an example which we understand is likely to be followed in some other branches of commerce.

With respect to the manner in which specimens are to be arranged and displayed, we quote the following from the GENERAL CONDITIONS:

> "11. In all cases where the productions of an individual are exhibited together, his wishes, with regard to the treatment of them, will be complied with as far as possible; but should they be of a nature to involve additional expense, the Commissioners cannot undertake to meet that expense out of their funds, but must call upon the Exhibitor to defray it himself. Glass cases, frames and stands of peculiar construction, and similar contrivances for the display or protection of the goods exhibited, must, in like manner, be provided by the person requiring them at his own cost."

We are, however, authorized to state that specimens furnished by Committees or other bodies in their collective capacity in compliance with the request or suggestion of the Commissioners, will be arranged by them as may appear most desirable, without any unnecessary expense to the parties by whom they may have been contributed. Every practicable precaution will be adopted to protect from injury the objects sent for exhibition; but the expense of insurance against fire, if incurred, must be defrayed by the proprietors of the goods.

ON THE MODE OF PUBLISHING THE TRANSACTIONS OF THE PHARMACEUTICAL SOCIETY.

SOME Members of the Pharmaceutical Society have recently suggested an alteration in the mode of publishing its Transactions. We believe it is generally known that the "Pharmaceutical Journal," in which these Transactions are published, is not an official work, the Society being responsible only for that portion of it which is distinguished as the "Transactions of the Pharmaceutical Society."

It is proposed, as an improvement upon this arrangement, that the Society shall in future publish its Transactions in a more official form, the Council having direct controul over the entire work, and employing a paid Editor, not a Chemist and Druggist. It is considered that this plan would be more analogous to that usually adopted by learned bodies—that it would be more consistent with the character and dignity of the Society—and that it would be conducive to harmony and good feeling among the Members.

A proposition brought forward with a view of promoting results so obviously desirable, demands attentive consideration; and the premises being proved, no difference of opinion could exist respecting the conclusion.

In order that the question in all its bearings may be clearly understood, it is necessary to advert to the circumstances under which the present arrangement originated—to explain the causes which led to this arrangement, in preference to the one now proposed; and, lastly, to consider whether these causes still operate, or whether the Society is ripe for the desired change.

It is also necessary, in drawing a comparison between the practice of the Pharmaceutical Society and that of other scientific bodies, to take into consideration the respective objects of the institutions, and the elements of which they are composed.

For example, the *Royal Society* (which is the type of learned bodies) has but one object in view, namely, the cultivation of science. Its List of Members comprises the most learned men of the age; its Transactions are voluminous, and the labour of furnishing the materials is widely spread. The Council superintends the publication of the Transactions, the cost of which is defrayed by the Society; and the Secretaries, who are salaried officers, perform the duty of Editors. This duty consists in arranging the materials in hand, and correcting the press.

The *Medical and Chirurgical Society* is another example of a learned body. It does not represent an entire class, but consists of individuals distinguished by their superior zeal or attainments in the profession to which they belong. The meetings of the Society are well attended, and the supply of scientific papers is abundant. A selection from these papers constitutes the Transactions; and these are published officially by the Society, the Secretary acting as Editor, under the direction of the Council.

The *Chemical Society* publishes a Quarterly Journal. This is in two parts; the first part consists of the Transactions of the Society, that is to say, papers (entire or in abstract) read at the meetings, with extracts from the minutes. The second part (in the number for October, 1850, lately issued) is entitled "Abstracts of Papers in the

'Philosophical Transactions,' by Henry Watts, B.A, F.C.S." This addition to the Transactions gives the work the character of a Journal, but no editorial or miscellaneous articles are introduced, and the Editor, Mr. Watts, acts under the direction of a committee of publication. The Journal is not the property of the Society, but of the publisher who takes on himself the pecuniary responsibility, furnishes to the Society at a definite charge, the requisite number for distribution among the Members, and has the remainder for sale on his own account.

The "Journal de Pharmacie" of Paris is private property, it is also the organ of the *Societé de Pharmacie*, and is distributed free of charge to the Members, the requisite number being purchased by the Society for that purpose. The Editors are the Proprietors, and meet once a month to discuss the contents of the next number—the Secretary of the Society (who is biennially elected) acts as sub-editor, and superintends the distribution of the Journal to the Members. The publisher pays the printer and superintends the distribution of the Journal to subscribers, for which duties he receives a commission. After the expenses are paid, including remuneration to the editors individually, for the articles written by each, and an annual editorial dinner, the surplus is divided among them, in equal shares.

This arrangement is in principle similar to that adopted with the Pharmaceutical Journal, except that in the former case there are several proprietors who derive an *income* from the work, including a dinner—in the latter there is but one proprietor, who derives a *loss*.* The Pharmaceutical Journal contains, in addition to the Transactions of the Society, various original and extracted articles relating to Pharmacy and the collateral sciences, allusions to passing events affecting the interests of the trade, critical notices of books, and answers to correspondents. Of the latter only a small proportion appear in the Journal, many correspondents being answered by post.

The Pharmaceutical Society, although properly claiming to be ranked among scientific bodies, belongs to the natural order "Compositæ," its three parts or sections being *Science*, *Protection*, and *Benevolence*. The exciting cause which led to its formation had reference rather to the protection of the trade than the advancement of science. Mature reflection led to the conviction that these two objects were intimately connected, and that the former could only be permanently secured in connection with the latter. But it was no easy matter to convince the entire body of Chemists and Druggists of the truth of this proposition. Neither the Government nor the Trade had propounded this opinion, and all previous associations of the body for mutual benefit had been founded on political and commercial considerations. Contentions with the Apothecaries, defensive struggles against the Legislature or the Board of Excise, projects for equalising prices, or the early closing of shops, had agitated at intervals the Pharmaceutical body. These commotions, like the waves of the sea, had succeeded each other, each in its turn producing a due proportion of foam, and then disappearing.

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* The Editor being a Member of the Council is precluded from deriving a pecuniary advantage from the Transactions, even if he had desired it. This, however, was never his object, and he *purposely* reduced the price to the Society below the actual cost, in order to be, like Cæsar's wife, beyond suspicion. The profit arising from advertisements and the sale of Journals to strangers is not retained by the Editor, but thrown into the scale in favour of the Society.

The Pharmaceutical Meetings were instituted for the purpose of diverting the minds of the Members from political contentions to scientific pursuits, and of counteracting the petty jealousies of the *trade* by promoting an interest in the advancement of the *profession*. The salutary influence of these meetings was soon manifest. Medical men and scientific chemists sanctioned them with their presence. Papers were read and discussed, and these formed the nucleus of the Pharmaceutical Transactions. Simultaneously with the establishment of the Pharmaceutical Meetings, the Provisional Committee were engaged in preparing the laws and constitution of the Society.

As this Society was not destined to confine its operations to the Metropolis, it was necessary to devise means for giving publicity to the proceedings, with a general invitation to Chemists to enrol their names as Members. For this purpose reports of the meetings, with other information, were printed for gratuitous circulation throughout the country. The first issue was in the form of a pamphlet entitled "The Transactions of the Pharmaceutical Meetings," afterwards the more general title "Pharmaceutical Transactions" was appended, with the following notice on the cover:

"NOTICE TO CORRESPONDENTS.

"In publishing the first number of the PHARMACEUTICAL TRANSACTIONS, the Editor solicits the support and assistance of his friends in the supply of scientific articles. Provided such support be afforded, it is his intention to continue the periodical publication of these Transactions, until the accumulation of materials and the importance of the information they contain, shall be such as to justify him in *proposing* to the Council of the Pharmaceutical Society the establishment of a monthly or quarterly Journal of Pharmacy.

"That such a publication ought to exist in this country is a self-evident fact. That there is among the Chemists and Druggists of Great Britain an amount of talent and experience, which, if brought into the field, would ensure its success, cannot be doubted. Inventions and discoveries in Pharmaceutical Chemistry are daily in progress. Some of them are published indiscriminately in the various medical periodicals; others, for want of a regular focus of promulgation, are never brought before the public at all. Many medicinal compounds and preparations are inf constant use in London, while the Chemist in the country is not aware oe their utility or even existence; and improvements in provincial towns are confined to their own immediate localities from the same cause.

"It is obvious, that the universal dissemination of such knowledge would be beneficial to all parties in the profession, as well as to the public at large, and that the legitimate source of this information would be a Journal of Pharmacy. But a publication of this kind, if undertaken by the Chemists and Druggists as a body, must be conducted on such a scale and carried on with such spirit, as shall be creditable to our scientific character in a national point of view. It would, therefore, be injudicious to undertake it without previously ascertaining the amount of zeal and energy which would be devoted to the work. For this purpose the Editor of the PHARMACEUTICAL TRANSACTIONS has taken upon himself the responsibility of illustrating the advantage of such a project by *an experiment*, and from the promises of encouragement which have been received from various quarters, he hopes to be able to substantiate the correctness of the foregoing assertions."

At the time the experiment was commenced, it was the intention of the Editor to continue the gratuitous distribution of the Transactions to *Members* and *Associates* for a few months, being well aware that the union of British Chemists and Druggists into a permanent scientific body was an undertaking which could only be effected by a determined effort—by "striking the iron while it was hot," regardless of labour, time, and expense. But the success of the experiment (evidenced by the rapid accession of Members and Associates) caused so large a disbursement, that the Council positively refused to allow the weight to rest on an individual, and voted payment for the Transactions from the commencement.

In the course of about six months from the origin of the publication objections were taken to the Transactions, on the ground that it was inexpedient to vest in one Member a responsibility and power which might be liable to abuse. The removal of the name of the Editor from the cover was proposed; but this was objected to on the ground that in that case the Society would be ostensibly responsible for the editorial and other articles not comprised in the Transactions. Various suggestions were made, but practical difficulties arose in regard to each, and it was ultimately resolved, in the absence of a better arrangement, to continue the work as before, the title being changed to "Pharmaceutical Journal and Transactions," in order to make a distinction between the official and non-official part of the work. It was distinctly stated in the First Annual Report (1842) that the Transactions of the Society were the only official part of the Journal. At the same time, the work has been devoted to the interests of the Society and the objects for which it was established. The tone and spirit of the Editorial articles have been directed to the promotion of unanimity in the trade, the advancement of education, and the advocacy of the claims of the body of Chemists and Druggists to protection and recognition as a branch of the profession.

Nine years have passed away. The experiment undertaken for a temporary purpose has become habitual. The Journal, which was originally repudiated as an official publication, has continued up to the present time to be the vehicle in which the Transactions have been published. Some Members are now dissatisfied with this arrangement. They have revived the notion that the Editor should not be in business as a Chemist on account of the opportunity thus afforded for turning the influence of "the press" to his own personal advantage.* They also object to some of the advertisements on the cover of the Journal, which, they say, improperly keep the names of the advertisers before the public to the prejudice of others who do not advertise. They desire to have the Transactions isolated from unofficial matter, and the entire publication brought under the immediate controul of the Council.

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* Not a single instance is, or can be, adduced in which this has been done: but the liability to such abuse of power has been industriously pointed out in a journal recently established, as well as in previous publications of a similar nature. The policy of each rival Editor, on his appearance in the field, has been to enlist in his service the "green-eyed monster," for the purpose of alienating the supporters of what they are all pleased to term a "monopoly," in the hope of building up a circulation on the wreck. The Pharmaceutical Journal has not been used as a vehicle for controversy with such "cotemporaries," nor did they excite any jealousy in the mind of the Editor. It was considered a favourable symptom that the taste for pharmaceutical literature had increased so much as to support a plurality of journals.

This is, in fact, reverting to the proposal prospectively suggested in the first number of the Transactions (1841). But the hypothesis on which the suggestion was founded, has not been substantiated by subsequent experience, and the argument now advanced is diametrically opposed to it.

In suggesting the establishment of an official Journal of Pharmacy by the Society, the Editor assumed, as a condition that the Members would put their shoulders to the wheel, that the labour of contributing the materials would be widely spread, and that the Journal would be not merely in name, but in fact, the Journal of the Society.

The argument now advanced in favour of the change is the assertion that "the annual and scientific meetings are almost deserted; that no life pervades them;" that "many Members have withdrawn their support from the Institution, or are indifferent with respect to its welfare, and take no part or interest in its proceedings." This statement, instead of denoting a disposition on the part of the Members to support and improve the Transactions, would rather (if assumed to be the fact) suggest the inquiry, whether those "who take so little interest in the proceedings," are likely to maintain the character of the Society when thrown on their own resources; yet the proposed remedy is the removal of the Editor of the Journal—the appointment of one who is not a Chemist and Druggist—and the publication of the Transactions officially by the Society.

We shall not here discuss the proceedings of an anonymous Committee which has been formed, and an anonymous circular which has been extensively distributed throughout the country, to the no small discouragement and perplexity of the Members. Nor do we think it necessary to comment upon a Memorial recently presented to the Council in support of the proposed alteration; but we may simply observe that the Memorialists and the anonymous Committee have commenced their work at the wrong end. They should have attended the meetings, furnished papers, induced their scientific friends to rally round the Society, and thus infused vigour into the Transactions. They might then, both as Members of the Society and as contributors to the Transactions, have appealed to facts in support of their theory, and advanced a substantial argument in favour of their proposition.

Whether this change, under existing circumstances, would be conducive to the credit and prosperity of the Society, and whether a publication consisting merely of the official Transactions of the Society would be preferable to the Journal at present circulated, are questions to be decided by the Members at large.

The statements respecting the apathy of the Members, and the "declining state of the Society," are greatly exaggerated, and notwithstanding the determined efforts on the part of a few individuals to spread general dissatisfaction, we hope and believe that the Society will continue to prosper, and ultimately realize all the objects for which it was established.

THE LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, September 13th, 1850.

THE PRESIDENT IN THE CHAIR.

T. C. Archer, Esq., gave a highly interesting lecture on "Igneous Geology," illustrated by some beautiful specimens from the museum of the institution. After referring to the Wernerian or Neptunian theory, supposing that all crystalline rocks were deposited from water, and that of Hutton, ascribing the effect to fusion by fire, he stated the opinion of modern geologists to be that both these agents were concerned in nearly an equal degree in producing these changes. The various theories entertained on earthquakes and volcanoes were discussed, the prevalent one being that molten matter or gaseous matter being thrown up from the earth's centre, if the earth's surface is weak it is shaken violently by an earthquake, until some weak point is pierced and a volcano formed. Several instances were given and illustrated by drawings, the formation of lava, pumice, trachyte, &c., explained, the lecturer referred to the geysers of Iceland, and concluded by pointing out the effect of electricity in the formation of metallic veins throughout the earth's crust.

Mr. Mercer gave an interesting account of the "applications of gutta percha to science," more particularly to the chemist, the surgeon, and the electrician. A very great variety of specimens were introduced, including carboys for muriatic acid, bottles for hydrofluoric acid, funnels, &c. &c., gutta percha silk, strapping for diseased joints, splints, stopping for teeth, balsam for cuts, catheters, bougies, and stethoscopes, ear-trumpets of every shape and size, insulating stools, discharging rods, Leyden jars, battery cells, electrotype moulds, and electric telegraph wires, including a portion of that uniting England and France. The paper was exceedingly interesting, and abundantly illustrated with specimens.

The Secretary announced, that on Monday, the 23d instant, a class would commence a course of Latin reading on Pharmacy, conducted by the Rev. J. England, to meet in the laboratory of the Institution.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE ÆGLE MARMELOS, OR INDIAN BAEL.

The *bark of the root*, and especially the *half-ripe fruit* of this plant having been recently imported by Mr. Pound, of Oxford Street, and sometimes used as astringents in the treatment of dysentery, we think a short notice of this plant and its medicinal products may not be unacceptable to some of our readers.

Ægle Correa, *Trans. Linn. Society*, vol. v., p. 222.
Nat. Order, Aurantiaceæ.

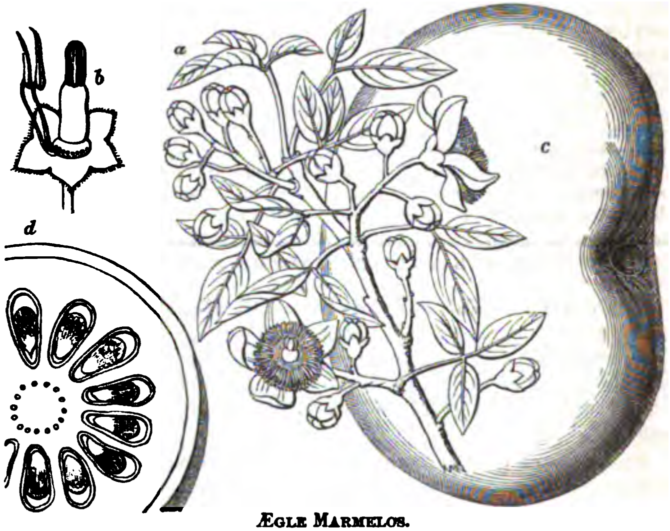
Flowers bisexual. Calyx 4-5 toothed. Petals 4-5 patent. Stamens 30-40; filaments distinct; anthers linear-oblong. Ovary 8-15 celled; ovules numerous in each cell. Style very short and thick. Stigma capitate. Fruit baccate, with a hard rind, 8-15-celled; cells 6-10 seeded. Seed coat woolly, covered with a slimy liquid.—Trees with simple spines. Leaves pinnate; leaflets 3, occasionally, but very seldom, 5, oblong or broad-lanceolate, crenulated, inconspicuously dotted, unequal, the terminal one the largest. Peduncles axillary, few-flowered, pedicels long. Flowers large (Wight and Arnott).

Ægle Marmelos Correa op. cit.; Wight and Arnott, Prod. Fl. Pen. Med. Or. i. 97; DC. Prod. i. p. 538; Spr. Syst. ii. p. 598; Roxb. Cor. Pl. ii. t. 143; H. Med. ii. p. 579; Wall.! L. n. 6379; Wight! Cal. n. 310.—*Feronia pellucida*, Roth. Nov. Sp. p. 384; DC. Prod. i.

p. 538; Spr. Syst. ii. p. 314.—*Crataeva Marmelos*, Linn., *Bilva* or *Mabua*, Sir Wm. Jones, Asiat. Res. ii. p. 349; *Covalum*, Rheede, Hort. Malab. iii. t. 37; *Bilacus*, Rumph. Amb. i. t. 81; *Bael*, *Bêl* or *Bela*, Hindee and Bengalee; *Beli*, Cyngalese; *Tanghula*, Malay; *Maredoo*, Telinga; *Willamarvum*, Tamool; *Bengal Quince.*

Middle leaflet petiolate, lateral ones almost sessile; common petiole terete (Wight and Arnott).

A tolerably large and erect tree; bark ash-coloured; branches few and irregular. Thorns axillary, in pairs, single, or none, very sharp and strong; leaves ternate; panicles small, terminal and axillary; flowers large and white; berry large, sub-spherical, smooth, with a hard shell, from 10 to 15-celled; the cells contain, besides the seeds, a large quantity of an exceeding tenacious transparent mucus, which on drying becomes very hard, but continues transparent; when fresh it may be drawn out into threads of one or two yards in length, and so fine as to be scarcely perceptible to the naked eye, before it breaks. Seeds from six to ten in each cell, oblong, a little compressed, woolly, attached to the inner angle of their cell. It is a native of Malabar and Coromandel.



ÆGLE MARMELOS.

a. Flowering branch.
b. Portion of a flower.
c. A fruit.
d. Section of fruit.

The bark of the root, the bark of the stem, the leaves, the flowers, and the fruit, are used in India.

1. *The bark of the root.*—Baboo Ram Comal Sen† says, that the bark of the root is peeled while fresh, and a decoction of it made, in the proportion of two tolas, or about an ounce to eight chittaks, or about a pint of water. It is boiled to one-fourth, and administered in bilious fevers. The decoction should be reduced to about one-half by boiling. The dose is two or three tablespoonfuls from

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† *Trans. Med. and Phys. Society of Bengal*, vol. iv.

two to six times a day, in bilious fevers, palpitations, hypochondriasis, and melancholia.

2. *The bark of the stem* is said by the same authority to be sometimes used in fever, but rarely alone, being more usually one of those mixtures which are known as combinations of fourteen or eighteen substances, and given in remittents. When used alone it is given in a similar decoction as the bark of the root.

3. *The expressed juice of the leaves*, diluted sometimes with a little water, is commonly given in colds and incipient fevers, when the patient complains of general dulness, pains in his limbs, and sense of fulness of stomach. The juice is slightly bitter and pungent, and induces perspiration. The young leaves are also used in ophthalmia, and are made warm and so applied to the eyes to relieve pain and inflammation.

4. Dr. Roxburgh mentions that the *flowers* are reckoned refrigerant by the Malabar physicians.

5. *The rind of the fruit* is used in dyeing yellow; and the fruit itself is employed both in the unripe and ripe states.

The *unripe* or *half-ripe fruit*, in which the medicinal properties of the plant are most decidedly manifest, is declared to be a most valuable and efficacious remedy in dysentery and all affections of the bowels accompanied by relaxation, and also in cases of irritation of the mucous membrane of the stomach and bowels. Although it relieves diarrhœa and dysentery, it does not constipate the bowels of those who are not troubled with these complaints. The unripe fruit is cut into small slices and dried, and in this state is used in the form of *decoction*, prepared with two ounces of the dried fruit and a pint of water. The mixture is to be gently simmered down to one-fourth, and of this the dose must depend on the attendant circumstances of the case. In bad cases of diarrhœa and dysentery, three tablespoonfuls are to be taken every two or three hours; in milder cases, the like quantity three or four times a day; and in mild cases of irritation, two or three times a day will be sufficient. To prevent or relieve flatus, two tablespoonfuls may be taken immediately after each meal. The *wine* made with sherry and *extract* of the dried fruit have also been used. A *preserve* is also made prepared from the unripe fruit, by boiling with syrup. This is given to patients labouring under bowel complaints.

The active or astringent principle of the unripe fruit is a modification of tannin. There is also much mucilage in the fruit.

The *ripe fruit* is said to be delicious, and exceedingly fragrant. Dr. Horsefield[*] states, that in Java it is considered to possess astringent qualities. Sir W. Jones observes of it, that it "is nutritious, warm, cathartic; in taste delicious, in fragrance exquisite; its aperient and detersive quality, and its efficacy in removing habitual costiveness, have been proved by constant experience." A sort of *sherbet* is prepared from it with tamarind-juice, which is beneficial in fevers and inflammatory affections attended with thirst. A *jelly* and a *preserve* are made of the ripe fruit with sugar, and are used beneficially by those who labour under habitual costiveness and irritation of stomach.

The glutinous mucus surrounding the seeds is used by painters as a size and varnish; and, according to Dr. Royle, is considered an excellent addition to mortar, especially in well-digging.

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[*] Quoted by Ainslie in his *Materia Indica*, vol. ii., p. 189.

MITCHAM: ITS PHYSIC GARDENERS AND MEDICINAL PLANTS.

(Continued from p. 119.)

III. WILD OR SQUIRTING CUCUMBER.

We know of but two places in England where the wild cucumber (*Momordica Elaterium*, Linn.) is cultivated for commercial purposes; these are Mitcham, in Surrey, and Ampthill, in Bedfordshire. The London market is chiefly supplied from the former place.

This plant is a native of the south of Europe, but flourishes well by cultivation in this country. It is essentially an annual; but Mr. Arthur, of Mitcham, assures us that if the roots be covered up during the winter, the plants survive through several seasons, and he has now some which have lived three or four years. So that it would appear that, if carefully protected from the winter cold, its life is prolonged, and from an annual the plant becomes a perennial.

The seeds are usually sown about March, and the seedlings planted out about June. A considerable number of the Mitcham plants are self-sown. When they grow very large and free, the stems become extraordinarily broad and flat. We have now one before us, whose stem, as it issues from the earth, is round and about as thick as the forefinger; but it gradually becomes flat and larger, until at its broadest part it is nearly four inches wide and half an inch thick.

A wet season is injurious to the fructification of this plant; and the present season, we are informed, has been a bad one at Mitcham.

The only part of the plant which is of use is the fruit, which, as is well known, is remarkable for bursting when ripe, and expelling its seeds with a portion of its juice with great violence and to a considerable distance (some say as far as eighteen or twenty yards), whence the name of the plant—the *squirting* cucumber. The fruits which have arrived at maturity are of a yellowish green colour; and the slightest touch at this period will disengage the fruit from its footstalk, and cause the violent expulsion of the seeds. It is, in fact, dangerous to walk among the plants at this period; for painful irritation of the eyes is sometimes produced by the contact of the juice with the conjunctiva.

The cultivators of the plant, at Mitcham, sell the cucumbers by the bushel. Each bushel contains 40lbs., and the price ranges from 7*s.* to 10*s.* Forty-five years ago the price charged to the Apothecaries' Company was only 2*s.* the bushel.* In 1820 Dr. Clutterbuck states that half a bushel of the fruits cost half a guinea in the market.†

Elaterium is manufactured from the cucumbers in London, at Mitcham and at Ampthill. At the time (September 3rd) of our visit, this year, to the Mitcham physic-gardens, the manufacture of elaterium had scarcely commenced. Some of the fruits had been gathered; but the chief manufacture of elaterium was expected to commence about the 9th or 10th of September. The plants, at the time of our visit, bore numerous fruits, and were still flowering.

The manufacture of elaterium, as practised at Mitcham, may be divided into four stages or operations:—1st. Washing and slicing the fruits; 2nd. Expressing the juice; 3rd. Straining the juice and setting it aside to deposit; 4th. The collection and desiccation of the deposit called Elaterium.

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* Malcolm, *Compendium of Modern Husbandry*, vol. iii., p. 122. 1805.

† *London Medical Repository*, vol. xii.

1. Washing is only requisite when the fruits are dirty, not otherwise. Each fruit is sliced longitudinally, by which it is divided into halves.

2. The juice is expressed in a common screw-press. The sliced or half fruits are wrapped in a hempen cloth and then put into the press, which is screwed up with some considerable force. One of the men engaged in the manufacture of elaterium told us that he used as much force as he was capable of exerting in screwing up the press. By some, however, this powerful expression is considered objectionable, on the ground of inferior quality of elaterium which is in this way obtained.

3. The expressed juice is then strained. One manufacturer merely strains it through a kind of colander (a perforated metallic plate). Mr. Arthur tells us that he strains it through two sieves—one a hair sieve, the other a cypress sieve. Instead of the latter a copper wire sieve, having 100 wires to the inch, may be used. The colander, above alluded to, cannot, it appears to us, be sufficient to separate the various shreds and pieces of vegetable tissue which escape from the press along with the juice. The expressed juice, as it escapes from the press, is usually received in a small tub, and when this is full the juice is strained. This appears to us to be an error of the Mitcham manufacturers—the juice should be strained as it runs from the press, before it has had time to deposit.

The strained juice is then set aside for the deposit to take place. At Mitcham the deposit vessels are common tubs or half barrels about eighteen inches high. This part of the process it appears to us also admits of improvement. The deposit vessels should be made either of glazed earthenware or of glass. The elaterium is deposited from the juice in a few (usually three or four) hours.

4. When the deposition of the elaterium has taken place, the supernatent liquor is carefully poured off. The deposit is then placed on calico cloths resting on hair sieves, and is there allowed to drain for about twelve hours. The drained deposit is then removed by a knife, and spread over small cloths and dried on canvas frames in the drying stove.

By one manufacturer we were informed that he dried the elaterium on paper.

Mr. Arthur tells us that one bushel or forty pounds of fruit yield about half an ounce of fine elaterium. This agrees with the experience of Dr. Clutterbuck, who states that half a bushel yielded "less than two drachms of elaterium." Some persons, it is said, obtain as much as three-quarters of an ounce from the bushel of fruits; but probably this is effected by the use of extra pressure, by which elaterium of inferior quality is procured.

Good elaterium has a pale pea-green tint. Inferior qualities have a duller or sadder colour.

We were assured at Mitcham that the juice from which elaterium has deposited is not used to obtain a second deposit, but is thrown away.

The juice which is expelled along with the seeds scarcely becomes clouded by exposure to the air, and is believed to be inert; but that obtained by pressure, from the burst fruits, does become milky, and this deposit constitutes the elaterium. It follows, therefore, that recently burst fruits are nearly, if not quite, as good for making elaterium as those which have not burst.

REPORT OF AN EXPERIMENT ON FOUR BUSHELS OF CUCUMBERS.

The fruits were sliced longitudinally, the pulp and seeds carefully scraped out, immediately placed on a sieve, and stirred without pressure. The juice thus obtained was set aside for six or eight hours, and yielded 7½ drachms of remarkably fine elaterium (No. 1), of pale green colour, and having the strong characteristic aroma which has been compared to that of senna or tea. The pulp and seeds were then washed in a little distilled water, subjected to gentle pressure, and, on being set aside to deposit, yielded half an ounce of elaterium (No. 2), of a greyish green colour, and having rather less of the fragrant odour.

The sliced cucumbers were then washed with distilled water and pressed, The deposit obtained (No. 3) amounted to an ounce. It has a dark, dirty, olive-green colour, less aroma than the former products, and is apparently unfit for use.

The fracture of the three samples differs considerably; No. 1 being the most friable, brittle, and easily reduced to powder; No. 2 similar, but in a rather less degree; No. 3 is more tough and gummy in its fracture.

In order to obtain the maximum product of good elaterium, it is necessary to strain off the liquid from the pulp and seeds as quickly as possible after the cucumbers are cut. The deposit speedily takes place on exposure of the juice to the air, and unless the above precaution be taken, a portion of it is likely to be left in the sieve with the pulp; or, if afterwards obtained by washing, it is more or less contaminated with the inert constituents of the pulp.

IV. ROSES.

Two sorts of roses are cultivated at Mitcham, namely, one known there as the *Damask Rose*, and which Dr. Pereira[‡] states to be the *Rosa gallica*, var. δ *officinalis*, De Candolle; and the second called at Mitcham the *Provence* or *Cabbage Rose*, and which, according to Dr. Pereira, is the *Rosa centifolia*, var. α *vulgaris foliacea*, De Candolle.

Mr. Moore (1805) states that:—

"The ground is prepared in the same manner as for lavender and liquorice, and the roses planted three feet asunder, are kept well cleaned and hoed, and in the autumn all the superfluous and dead shoots are cut out, and the ground dug between them. Every other year they are refreshed with twenty-four loads of spit dung, pointed in between them, and close to the roots."

"Mr. Moore has about seven acres of the Damask Rose and three of the Provence or Cabbage Rose, of each of which he plants a few every year to keep up a succession in high order."[§]

The following is the mode of cultivation as now practised by Mr. Arthur:—

[‡] *Elem. of Materia Med.*, vol. ii., p. 1548. Second Edition.

[§] Malcolm, *Compendium of Modern Husbandry*, vol. iii. 1805.

1. The Damask or French Rose—*Rosa Gallica*, var. *β officinalis*, De Cand.

These roses are planted in rows a yard apart, with about eighteen inches between the plants. The time for planting is autumn or spring. They are propagated by dividing the roots, and also from suckers or runners, which throw up fresh plants. After about three years the plant is liable to be attacked by an insect, the maggot of which destroys the leaves and the young buds. It is, therefore, usual to renew the plantation every two or three years. Some fresh plants are grown every year, only the best of the old stock being preserved. After the fourth year the plants are worth nothing. The tops of the plants are cut every year with shears to encourage the growth of new shoots. Roses will grow either in a light or heavy soil, but they flourish best when the soil is rather heavy.

The season for gathering the flowers of the damask rose commences early in June, and lasts about five or six weeks. They are gathered by women and children twice a-day, in order to secure the buds before they are too much expanded. The buds are dried in stoves in the same manner as camomiles, except those required for conserve, which are sent to market in the fresh state.

2. The Provence or Cabbage Rose—*Rosa centifolia*, var. *α vulgaris foliacea*.

These roses are propagated by dividing the roots, and the mode of cultivation resembles, in most respects, that which is adopted with the other variety. They are not, however, liable to the maggot, and the plants are therefore not renewed so often. They continue to flourish for many years. They require more care in pruning, the old wood being cut away with a knife, which causes new shoots to be formed, and it is these latter which produce the flowers.

The gathering usually commences the last week in June, and is continued for about five weeks. The flowers being used in the expanded state they are gathered every other day, which is found to be often enough.

In the process of distillation it is a common practice to put the entire flowers into the still as received from the grower, but the result is much improved by rejecting the calyx. This is rather troublesome, as each flower must be separately stripped, which occupies considerable time and increases the expense; but the labour is well bestowed, as the water is much more fragrant. During the distillation a quantity of concrete essential oil floats on the water, which, when collected and filtered, resembles the foreign otto of roses. We have seen about half-an-ounce, which resulted from the distillation of 150 gallons of rose water. The quantity, however, is too small to be worth collecting for sale, and it is generally supposed that its abstraction impoverishes the water; and that, although the water is saturated at the time, it afterwards dissolves by degrees the essential oil which is left floating in it. The water should be strained before it is used, as the particles of oil are likely to produce irritation, especially when the water is used for eye lotions.

V. ACONITE OR MONKSHOOD.

We find that three sorts of aconite or monkshood are cultivated at Mitcham; but on the 3rd of September (1850) only one sort (termed *giant monkshood*) was in flower.

1. The usual sort cultivated is called *common monkshood*, but we were too late in the season to see it. From the description which was given to us of it, we suppose that it is probably *Aconitum Nap eus* We were informed that it is planted in the autumn (October) by dividing or separating the tubers, and the roots may be gathered the following autumn; but it is a better practice to leave them for two years in the ground. When gathered, they are washed and dried. This sort of aconite flowers in June. One of the growers informed us that he was in the habit of cutting off the flowers; we suppose for the purpose of promoting the growth of the roots.

2. Mr. Arthur informs us, that the preceding is the only sort of aconite which he cultivates; but that there is a party-coloured sort grown at Mitcham, the roots of which are sold in the London market. The flowers are white, with a little blue in them. It is a fine tall plant, which, like the common aconite, flowers early in the season. We have had no opportunity of seeing this sort.

3. At Mr. Moore's physic-grounds we found another sort of aconite in cultivation, under the name of *giant monkshood*, but we were informed that as yet none of it had been taken to market. The specimens which we saw were about five feet high. The inflorescence was a somewhat loose panicle, with ascending stiffish branches, the helmet conical, the colour of the flowers a paler or brighter blue than that of *A. Napellus*, the staminal filaments hairy, the carpels or young fruits converging. The last character readily distinguishes it from *A. Napellus*, the carpels or young fruits of which diverge from each other. It appears to be referable to Reichenbach's[*] section Corythælon, which is characterised as follows:—(Rad. tuberosa, fol. 5-7-pedata) perianthio deciduo, fructu juniori nutante, carpidiis apice convergentibus." In this section Reichenbach places three species—*A. palmatifidum*, Reichenb., with smooth filaments; *A. exaltatum*, Bernhardi, with hairy filaments and conical helmet; and *A. Stoerkianum*, Reichenb., with hairy filaments and vaulted helmet. From these characters this giant aconite appears to be *A. exaltatum* of Bernhardi, of which "A. decorum" is given by Reichenbach as a synonyme. In confirmation of this statement we find that the giant aconite of Mitcham agrees in every particular, which we can discover, with a plant growing in the gardens of the Royal Botanic Society, Regent's Park, and ticketed "Aconitum decorum." Reichenbach says, this species flowers in July and August in Germany: we found it in flower and beginning to give fruit, both at Mitcham and at the Regent's Park, in the beginning of September.

RESULT OF A FEW DISTILLATIONS OF OIL OF LAVENDER ON THE SMALL SCALE.

From the following statement it will be seen, that the product of oil varied considerably in quantity in the several distillations, although all were performed under similar circumstances. A deficiency in the product of the first distillation might have been expected, as the water, having been reserved from the last season, had probably lost some of its strength. In the other operations the water was returned fresh into the still. The quantity of water used was fifty gallons. Of this about thirty gallons were preserved from each distillation to be returned into the still, and the remaining twenty gallons added to make up the quantity. That which remained in the still after each distillation was thrown away. The difference in the product, in all probability, depends chiefly on the state of the plant.

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[*] *Flora Germanica Excursoria.*

The weight of a dozen bundles of lavender was about 20lbs. The stalks were cut off before distillation. The price per bundle being about 2*s*. 6*d*., it will be seen, on calculation, that the cost of the oil, when obtained in this way on the small scale, is considerably above the market price.

	lb	oz.
Aug. 7th, 15 doz. bundles lavender		
Product 1st....	0	15
" 2d. ...	0	2½
	1	1½
Aug. 8th, 24 doz. bundles		
Product 1st....	1	4½
" 2d. ...	0	3½
	1	8
Aug. 9th, 24 doz. bundles		
Product 1st....	1	10¾
" 2d. ...	0	4¾
	1	15½
Aug. 10th, 24 doz. bundles		
Product 1st....	1	4¼
" 2d. ...	0	5
	1	9¼
Aug. 12th, 24 doz. bundles		
Product 1st....	1	4¼
" 2d. ...	0	8½
	1	12¾

	lb.	oz.
Aug. 13th, 24 doz. bundles		
Product 1st....	1	7¾
" 2d. ...	0	8½
	2	0¼
Aug. 14th, 24 doz. bundles		
Product 1st....	1	7½
" 2d. ...	0	5½
	1	13
Aug. 15th, 24 doz. bundles		
Product 1st....	1	12
" 2d. ...	0	4½
	2	0½
Aug. 16th, 24 doz. bundles		
Product 1st....	1	7½
" 2d. ...	0	1¼
	1	8¾
Aug. 17th, 24 doz. bundles		
Product.........	1	13

ON THE ACTION UPON THE GALVANOMETER BY ARRANGEMENTS OF COLOURED LIQUIDS IN A U TUBE.

BY MR. THOMAS POLLOCK,
Member of the Pharmaceutical Society.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—In your favourable notice of the pamphlet *On the Action upon the Galvanometer, by Arrangements of Coloured Liquids in a* U *Tube*, you have expressed a wish that we had stated our mode of manipulation. We will, with your kind permission, endeavour to do this as briefly as possible.

1. OBJECT OF THESE EXPERIMENTS.—From a previous course of experiments, Mr. Mackrell first observed that the deflection of the galvanometer, occurring from the mutual action of the coloured liquids in a U tube, was related to the position which these *two* colours occupied in the spectrum; that is if the less refrangible, as the red or yellow were

in the west arm, and the more refrangible, as green or blue were in the east arm, then the deflection was east. The arrangement with the yellow and green nitrous acids may serve as an instance. But there were some exceptions to this view. It was, therefore, determined to pursue the present course of experiments. To observe the effect on applying heat to each arm of the tube, and also the effect on raising or lowering the electrode in each liquid.

2. Apparatus employed and Mode of Experiment.—The U tube was seven inches high, and three-eighths of an inch internal diameter. It was placed in a slit in a piece of wood, supported obliquely in order to allow the application of heat by means of a spirit lamp to either arm. The electrodes were of platina, and connected by two copper wires with the astatic galvanometer, placed upon a table at the north side of the room. In operating, the heavier liquid was poured into the tube first. Then the lighter liquid was carefully dropped upon the former. It being essential to the success of the experiment that admixture of the two should be prevented as much as possible. The electrodes were then inserted, and the deflection observed; then the effect on raising and lowering the electrodes in each liquid, and lastly, heat applied to each arm. In commencing these experiments, being unaware of those general laws which subsequently developed themselves, the heat was applied first to the west, and sometimes to the east arm of the tube. Sufficiently puzzling were the results. Sometimes the deflection was increased, sometimes diminished. Sometimes no action or no alteration in the existing deflection would occur. The needle would appear spell-bound: all oscillation suspended. Sometimes the heat would increase the deflection, then suddenly diminish it, or send it in the opposite direction. Its motion might appear as if directed by fancy, and refusing obedience to any known law.

A list of these arrangements, where this nonaction was observed, was now made out; and the great fact was now for the first time disclosed, that they constituted two classes only. 1st. Those arrangements having one liquid colourless.—2d. Those arrangements whose colours were non-complimentary; that is, are such as adjoin each other on the same side of the neutral point of the spectrum, or where the deepest yellow and lightest green adjoin each other; such as red and orange, orange and yellow, or green and blue. Several arrangements belonging to these two classes were not in the list. These were now examined; and it may be almost needless to say, that with certain exceptions immediately to be referred to, they all acknowledge the supremacy of the general law. Thus the main difficulties of this investigation were now disposed of. There are some non-complimentary, and also some arrangements containing a colourless liquid, which do not exhibit this nonactive state; but the former were found to be in a state of transition, becoming complimentary; and the latter to be undergoing chemical change, manifested by the colourless liquid taking the complimentary colour to the coloured liquid, by forming a film at the adjoining surfaces of the two liquids, or forming a deposit or precipitate.

3. Results obtained in this Course of Experiments.—(a.) *Non-complimentary arrangements, inactive on application of heat to one of the liquids. Temporary inactive, except occasionally a slight residual action on making and breaking contact.* In order to exhibit this non-

active state, the rule to be observed is, to apply the heat to that liquid having the weakest internal attractive force; if to the other, action will be obtained. Thus, in the arrangement with neutral sulphate of nickel and the sulphate of copper,—if heat be applied to the latter as the attractive force of sulphuric acid—for copper is weaker than for nickel—there will be no action; but if to the former deflection E. 6° will be obtained.

(b.) *Colourless arrangements either in one or both liquids, inactive on application of heat to one of the liquids. Temporary inactive, except when accompanied by chemical action.* If heat be applied to the coloured liquid there will be no action; if to the colourless one there will. Those arrangements with the diluted sulphuric acid beautifully illustrate this.

(c.) *Complimentary arrangements active when heat is applied to either liquid, the deflection being either increased or diminished. Action permanent.* If they become non-complimentary or colourless, they act accordingly. The arrangement with yellow nitrous acid in the west, and green nitrous acid in the east arm, well illustrate this. The settled deflection was E. 26°. Heat being applied to the latter changed the green to yellow, thus rendering it non-complimentary to the yellow acid of the former. The deflection fell to E. 23°. On cooling the green returned, and with it the complimentary state, and the deflection returned to E. 26°.

(d.) *The action of yellow and green nitrous acids upon colourless nitric acid complimentary.* If, in these two experiments, we observe the line of demarcation of the two liquids, we shall find that in the former instance the colourless acid has formed a green film, and, in the latter, a yellow one; thus demonstrating this complimentary inductive action.

(e.) *The action of coloured liquids upon colourless pure muriatic acid, and new and old acid solution complimentary.* It is necessary here to state, that the acid solution here referred to is a mixture of nitric acid one, muriatic acid seven, and distilled water thirteen parts. The old solution had been mixed some time. In all these arrangements, about thirty-six in number, the colourless liquids assumed the complimentary colour to the coloured liquid.

(f.) *The action in the east exceeds that in the west arm, when heat is applied to the arrangement, having diluted sulphuric acid in the latter and solution of potassa in the former.*—The action here is temporary, existing only during the formation of a film, which soon ceases. If heat be applied to the west, the deflection will be E 1½°. If to the east arm, it will be E 4°. But the whole course of these experiments indicates the superior activity in the east arm, except where the laws above shown to exist, interfere with such result.

4. Reply to the Objections which have been made to this Course of Experiments.—It has been objected that the phenomena of these experiments are referable to the heat employed and the chemical action between the liquids. This is granted. It is owing to the stronger internal attractive force remaining undisturbed in the cold liquid, when heat is applied to that liquid, having the weakest internal force that the non-active state is owing. It has been further objected that colour has nothing to do with the phenomena. It was never imagined that colour here acted as a cause. But if colour has nothing

to do with the phenomena, how is it that complimentary arrangements never exhibit the non-active state, while non-complimentary always do, except chemical action be manifested?

In conclusion, much remains to be added, but we must not trespass any further. It is hoped enough has been already stated to show that if we obey the dictates of the galvanometer, we shall be enabled to substitute simplicity for complexity, certainty for doubt, thereby to extend the boundaries of science.

129, *Fenchurch Street*, *Sept.* 16, 1850.

KOUSSO.

"Skin for skin; yea, all that a man hath will he give for his life."

The speculators in kousso, have, in practice, adopted this as their text. They hold a large stock of the drug, and they are determined to hold it until they have discovered what is the maximum price that *avarice* can extort from *suffering*. They ask — what would not a patient give to be released from the annoyance produced by a living tape-worm, several yards in length? To a rich man (they say) a cure would be cheap at almost any price, and a poor man could better afford to pay two or three guineas for a speedy cure, than to linger for several weeks in a hospital. They, therefore, take credit to themselves for liberality in offering at the rate of 10*s.* or 15*s.* the *half-ounce* a drug, which, we are informed, would, at 20*s.* a pound, yield a fair profit to the importer.

The holders of the kousso have over-reached themselves. Neither the public nor the profession will submit to the extortion, and if any thing else were required to drive the remedy out of the market, it is the questionable shape in which alone it can be purchased—namely, in powder. This is contained in half-ounce bottles. It has been suspected to be contaminated with pomegranate bark, which in appearance it somewhat resembles. Whether this be the case or not, the circumstance of its being only sold in powder involves it in suspicion, and we anticipate that the demand will altogether cease before the remedy has had a fair trial.

It is the opinion of many authorities that the male fern is quite as efficacious as the kousso. We have known the best results attend its administration in some cases, and we have been informed that it is likely to come into demand. The substitution of other varieties of fern for the filix mas, has tended to bring the remedy into disrepute. Attention should therefore be paid to this circumstance.

PATENT MARKING INK.

Several Chemists who have been in the habit of preparing and selling marking ink requiring no mordant, made, according to the principles of Mr. Redwood's process, have been recently threatened with injunctions for the alleged infringement of a patent. We therefore take this opportunity of stating the circumstances of the case for the benefit of the parties so threatened.

Mr. Redwood published his formula on the 10th of February, 1847.

He had previously *for several years*, prepared the ink, using tartrate of silver as described in his paper.

On the 3d of December, 1846, the Rev. J. B. Reade, of Aylesbury, took out a patent for "An invention of certain improvements in Inks, and in the processes by which the same are manufactured, and the application of some of these processes to the production of certain Salts." In the specification, which was published (June 3d, 1847) a formula, identical in principle with that of Mr. Redwood, was introduced (see Pharm. Journ., vol. vii., p. 183).

If the patentee had merely relied on the magic influence of the word PATENT as applied to his ink, in obedience to the popular prejudice in favour of the Royal Arms, it would not have been our business to interfere; but when we find threats resorted to for the purpose of depriving Chemists of the right of using Mr. Redwood's formula, an exposure of the facts of the case is imperative.

Mr. Redwood might have taken out a patent for his marking ink if he had thought proper so to do; but he chose the more liberal alternative of *giving* the formula, which is now public property.

We, therefore, advise any Chemist who may be threatened with an injunction for making or selling marking ink, containing tartrate of silver, as recommended by Mr. Redwood, to continue to prepare and vend the same to all intents and purposes, as fully and amply as if the said threat had not been uttered. In case of need, the Editor of this Journal may be called as a witness to prove that the said ink was *made and sold several years before the date of the patent.*

BABUL BARK.

RECENTLY a sample of Babul or Babool bark (the bark of *Acacia arabica*) has been sent to this country from Calcutta to ascertain if it will be likely to sell for tanning purposes. Some of the leather tanned on the banks of the Ganges with this bark is but little inferior to our oak-bark tanned leather; but there is reason to believe that the freight will be more than the bark will bear. In India this bark is extensively used in tanning leather. The specimen which we have seen was in coarse, large, very fibrous quills, of a reddish colour.

ON THE USE OF LEAD IN THE MANUFACTURE OF SUGAR.

ABOUT twelve months ago (vol. ix., p. 220) we gave an account of a process which had been patented, first, by Mr. Sievier, in July, 1847, and afterwards by Dr. Scoffern, in December of the same year, for the use of subacetate of lead and sulphurous acid in the manufacture of sugar. The claim to priority of discovery, which was at that time subject of litigation between the above-named patentees, has been subsequently compromised—Mr. Sievier receiving a substantial acknowledgement, and leaving Dr. Scoffern in undisputed possession of the patent. Another question has, however, been raised, which relates to the merits of the process itself. It is this:—Can subacetate of lead be used as a defecating agent in the manufacture of sugar without danger to the public? On the first publication of the patent, opinions were freely expressed that it could not safely be brought into practical operation, and Dumas, the eminent Chemist and French Minister, acting upon this opinion, prohibited its introduction into France or her colonies; yet the process, in some respects, being an advantageous one, great efforts were made to induce its adoption by manufacturers, and equally active steps have been taken to guard against the injurious effects which it was thought might ensue to the public.

The attention of the Government being directed to the subject, the following circular was issued from the Colonial Office, in May of last year:—

(*Circular.*) (*Copy.*)

Downing Street, 17*th May*, 1849.

SIR,—I transmit to you herewith, an extract from a letter which I have received from the office of the Lords of the Committee of Privy Council for Trade and Plantations, pointing out the highly injurious effects that may arise from the manufacture of sugar, by a process described in a patent granted to Mr. Scoffern, in December, 1847, "for Improvements in the Manufacture and Refining of Sugar." I have to desire, that in the event of its becoming known to you that the adoption of this process for the manufacture of Sugar is contemplated within your Government, you will cause every publicity to be given to this statement; should you have no reason to believe that the process is likely to be made use of, it will be better that you should abstain from calling public attention to the possibility of manufacturing sugar in a manner which is economical, but dangerous.

I have the honour to be, Sir, your obedient Servant,

(Signed) GREY.

Extract from a letter from the Secretary to the Lords of the Committee of Privy Council for Trade, to Benjamin Hawes, Esq., dated Whitehall, 21st April, 1849.

I AM directed by the Lords of the Committee of Privy Council for Trade to represent to you, that their attention has lately been called, by several persons qualified to express their opinion on the subject, to the specification of a Patent for "Improvements in the Manufacture and Refining of Sugar," granted in December, 1847, to Mr. John Scoffern, of Upper Holloway, the processes therein described and claimed being considered highly dangerous to human life, inasmuch as they include the employment of a deadly poison,—acetate of lead, for defecating cane-juice, or sugar in a state of solution, while dependence is placed upon a further process for separating the lead from the sugar, when its defecating effect shall have been produced.

The processes here mentioned may, doubtless, be carried on with the most perfect safety in the laboratory of an accomplished Chemist, or even in a manufactory under the same careful and scientific direction; but the case is widely different when, as in the usual course of sugar melting in our refineries, and still more in the operations of the boiling-houses in our sugar colonies, the management is almost necessarily confided, for many hours together, to men without education, who cannot be expected to attach the importance which it deserves to the careful carrying out of their instructions, and who will indeed be without the knowledge which should enable them to determine whether the necessary discharge of the poisonous ingredients has been effected.

It is the uniform custom in our sugar refineries to begin the daily operations at a very early hour in the morning, much earlier than the arrival on the premises of the proprietor, who seldom, if ever, lives on the spot; and in the colonies, it is believed to be the practice, during at least the height of the crop season, to carry on the operations of the boiling-house, without intermission, from Monday morning to Saturday night, and necessarily during a great part of this time the processes are confided to uneducated persons.

A gentleman (Mr. Gordon) has lately been sent from London to the Mauritius, by the proprietors of Mr. Scoffern's patent, in order to its introduction to use in that important colony; and it is probable that other agents may have proceeded, or soon may be sent, to other of our principal sugar growing possessions; under which circumstances I am directed by their Lordships to express their wish that you should call the attention of Lord Grey to the subject, leaving it to his Lordship's consideration whether any directions can be properly given to the governors of such colonies, to take steps for cautioning the sugar planters concerning the use of chemical agents so highly dangerous, the consequences of which might prove exceedingly serious.

This communication from head quarters appears to have produced the desired effect. The Legislature of Antigua passed an Act prohibiting the adoption of the new process. An investigation was also instituted by the governor of British Guiana, from which resulted reports from Dr. Shier, the colonial agricultural chemist; Dr. Blair, the surgeon-general; and Dr. Wilton Turner, a chemist of eminence, employed in investigations on the manufacture of sugar; who concurred in opinion that the complete separation of the lead from sugar made by Dr. Scoffern's process cannot be ensured, and that specimens made by the agent to the patentee had been found to contain the pernicious ingredient in sufficient quantity to render it injurious to health. Dr. Wilton Turner suggested that the casks containing sugar made by this process should be branded with the word "lead."

These results were reported to Earl Grey in the early part of this year; and that the subject had excited some degree of public interest at this time may be inferred from the publication of the following letter in the *Times* of January 3d:—

TO THE EDITOR OF "THE TIMES."

SIR,—The Royal Junta de Fomento of the island of Cuba, having been informed that some periodicals in this country have lately published various articles, in which it has been asserted that the acetate of lead was employed in the manufacture of sugar in that island, has authorized me to declare, that in no part of the island of Cuba is either the acetate of lead, or any other substance prejudicial to health, made use of in the fabrication of sugar.

J. G. MIRANDA, Acting Spanish Consul General.
Spanish Consulate General, 37, *Old Broad Street*,
January 2, 1850.

The Government lost no time in consulting the highest authorities, chemical and medical, in this country, on a subject of so much importance to the safety of the public, as will be seen from the following official correspondence:—

Inland Revenue Office, Old Broad Street,
March 25, 1850.

GENTLEMEN,—I have received instructions from the Government to procure an accurate examination of the mode of refining sugar, described in the annexed specification of John Scoffern, with the view of ascertaining whether the separation of the lead be so effectual that the patent may be used with safety to the public.

I have great satisfaction in finding that you are willing to undertake the investigation, and request that you will favour me with your report so soon as your inquiries are completed.

I have only further to remark, that I hope you will recollect that the process of sugar refining is conducted on a large scale, and by common workmen, who may not be sufficiently impressed with the necessity of entirely freeing the products; viz., refined sugar, bastards, and molasses, from any trace of deleterious ingredients.

I have the honour to be, Gentlemen,
Your very obedient Servant,
JOHN WOOD.

To Thomas Thomson, M.D., F.R.S., Regius Professor of Chemistry in the University of Glasgow.
Thomas Graham, Esq., F.R.S., Professor of Chemistry, University College, London.
A. W. Hofmann, Ph. D., Professor of Chemistry, Royal College of Chemistry, London.

These eminent Chemists, after an elaborate investigation of the subject, made the following report:

London, June 26, 1850.

SIR,—The undersigned have to report the results of a chemical examination, made at your request, of the mode of refining sugar described in the specification of Dr. John Scoffern, of date December 8, 1847, with the view of ascertaining whether the separation of the lead be so effectual that the patent may be used with safety to the public.

In this inquiry we have kept in mind that the process of sugar refining is conducted on a large scale, and by common workmen, who may not be sufficiently impressed with the necessity of entirely freeing the products, namely, refined sugar, bastards, and treacle, from any trace of deleterious ingredients.

It was found necessary to investigate the following points:—

1. Whether the ordinary chemical means of discovering lead are applicable and sufficient for ascertaining the presence of minute quantities of that metal, in solutions containing sugar and soluble sulphites, as in the case before us.

2. Whether traces of lead find access to the colonial moist sugar, in its first preparation, or afterwards to loaf sugar, bastards, and treacle, in the ordinary process of refining.

3. To repeat the process of the patent in the laboratory, and test the efficacy of the means recommended for the entire separation of the lead.

4. To inspect a refinery in which the new process was in operation on a large scale, and to examine the refined sugar, bastards, and treacle produced on several different occasions by the new process.

1. It was found by us that lead purposely added to sugar of the new process, was much less conspicuously indicated by the hydro-sulphuric acid, than it was in a comparative experiment, with ordinary refined sugar, even after the sulphites present in the former were destroyed by means of chlorine. By a modified process, however, described in the Appendix to this Report, the separation of lead was made easy and complete from both descriptions of sugar, when that metal was present in the smallest appreciable quantity. The sufficiency of our process was tested by repeating the examination of the liquids for lead, after destroying the sugar by fermentation, in a large number of instances.

2. Minute quantities of lead were discovered in an authenticated sample of moist West India sugar, amounting to the quantity of metal represented by 0.39 grain of sulphate of lead from one portion of four pounds of this sugar, and 0.19 grain of sulphate of lead from another equal

portion of four pounds of the same sugar. The lead was unequally diffused, and it is probable, therefore, existed among the insoluble matters of this sugar, which were considerable.

No lead whatever appeared to be present in four loaves of sugar refined in different operations by the ordinary process, at least, so much as is equivalent to one-twentieth of a grain (0.05 grain) of sulphate of lead could not be present in four pounds of any of those samples.

Four pounds of bastards from the same refinery as the preceding loaf sugar, gave 0.19 grain of sulphate of lead, and 0.09 grain of oxide of copper in one analysis, and 0.25 grain of sulphate of lead, with 0.07 grain of oxide of copper, in a second analysis—mean 0.22 grain of sulphate of lead, and 0.08 grain of oxide of copper.

Treacle from the same refinery gave, in one experiment, 0.62 grain; and, in a second, 1.21 grain of sulphate of lead from four pounds—the mean proportion from four pounds is 0.91 grain of sulphate of lead.

It thus appears that a sensible, although it may be a wholly uninjurious proportion of lead, is occasionally present in sugars which have not been prepared by the new process. This lead may be reasonably referred to the use of leaden cisterns and pipes in the ordinary processes of manufacture, and to some extent, also, with the bastards and treacle, to the general practice of painting with white lead the inner surface of the metallic cones used as moulds for leaf sugar. The inquiry in regard tô the new process becomes thus a question of degree, and not simply of the presence or absence of lead.

3. The directions of the specification of the new process were implicitly followed on three different occasions—the quantity of moist brown sugar operated upon being 2lbs. in one operation, and 4lbs. in each of the other two operations. The syrup, after the application of the sulphurous acid and chalk, was submitted to the same rigid analysis as the preceding samples of sugar, without the discovery of any trace of lead remaining.

The means directed for the removal of lead appeared thus to be sufficient for that purpose, when applied with the means and attention which the process can receive in a chemical laboratory.

4. By the courtesy of Messrs. Goodhart and Co., sugar refiners of Limehouse, who were working under the new patent, we obtained properly authenticated samples of refined sugar of ten different operations, with one sample of bastards and two samples of treacle, all produced by the new process.

Four of these loaves were particularly examined, including the two samples which appeared by certain preliminary experiments to yield most lead in the whole series. Four pounds of each sample gave the following proportions of sulphate of lead:—

Loaf, No. 3	0.10 grain sulphate of lead.
" 4	0.08 " " "
" 6	0.13 " " "
" 10	0.10 " " "

Lead, therefore, appears to be uniformly present in these loaves; but in a proportion which is quite insignificant, and to which no injurious influence could be justly ascribed.

Three pounds of the bastards, from the lead process, gave 1.37 grain of sulphate of lead.

Four pounds of the treacle gave 5.16 grains of sulphate of lead in one analysis, and 6.32 grains in a second analysis.

Four pounds of the second sample of treacle, which was obtained from Messrs. Goodhart at a later period than the other samples, gave 2.73 grains of sulphate of lead.

The proportion of lead in one of these samples of treacle is sufficiently high to excite apprehensions, if treacle were consumed as largely and continuously by individuals as sugar is, particularly as the metal exists in the state of a soluble salt; but the second sample of treacle gives a considerable less proportion of lead, which was not exceeded in other samples of treacle made by the new process, which were obtained from a different source.

On application to Messrs. Evans, of Cork, we were favoured with another series of products obtained in refining sugar by the new process, in the manufactory of these gentlemen.

The samples were taken by Mr. Adam Young, of the Inland Revenue, and conveyed to us properly described and labelled. They consisted of six loaves of different operations, two samples of bastards, and two samples of treacle.

Of five of the loaves, four pounds of each gave the following proportions of sulphate of lead:—

Loaf, No. 1 .... 0.66 grain sulphate of lead.
" 2 .... 0.37 " " "
" 4 .... 0.09 " " "
" 5 .... No lead.
" 6 .... 1.05 " " "

It appears that the presence of lead is nearly as constant in these samples as in the former, and the usual proportion of the metal is sensibly greater. The metal appeared to be present in both cases, chiefly in an insoluble form.

The sample of bastards, which was lightest in colour, gave 0.74 grain of sulphate of lead in one analysis, and 0.72 grain of sulphate of lead in another—mean, 0.73 grain from four pounds.

The sample of bastards, which was dark in colour, gave 0.42 grain of sulphate of lead in one analysis, and 0.48 grain of sulphate of lead in another—mean, 0.45 grain from four pounds.

Of the two samples of treacle, the lighter coloured, which was marked "for consumption," gave 0.87 grain of sulphate of lead from four pounds. The other sample of treacle of a dark colour, and marked "to be passed through bed of charcoal," gave 2.19 grains of sulphate of lead from four pounds.

It appears from the foregoing details that the refined sugar, bastard, and treacle, generally acquire a trace of lead from the new process, sufficient to be distinguished by chemical tests.

That the lead found in the refined sugar is minute, the quantity not exceeding that occasionally acquired by the bastards and treacle in the ordinary process of manufacture.

In the bastards of the new process, the proportion of lead is not great, but sensibly exceeds the latter standard.

The lead appears to accumulate in the treacle, but in no case that we have had an opportunity of observing, to such an extent as would justify us in pronouncing the treacle to be poisonous.

The inspection of the process on the large scale satisfied us that the lead may be removed from the sugar to a point beyond danger, provided the operations are constantly watched by a person competent to apply the necessary chemical test of purity to the products.

In conclusion, although our results do not indicate certain and immediate danger from the use of this process in British refineries, still we must deprecate its extension, on the general ground that poisonous substances should never be used in the preparation of an article of food, where they can be avoided; the object effected in this process by means of a poisonous material, the use of which is unquestionably attended with the possibility of grave accidents, being one which is sufficiently attainable otherwise without danger.

THOMAS THOMSON.
THOMAS GRAHAM.
H. W. HOFMANN.

John Wood, Esq., Chairman of the Board of Inland Revenue.

APPENDIX TO REPORT.—*Method of Analysis.*

The sugar was dissolved in several times its volume of distilled water and washed, hydrosulphuric acid in great excess was passed through the solution. The liquid was then mixed with a solution of egg albumen, agitated well, and afterwards heated to coagulation in a porcelain vessel.

The coagulum which contained the lead in the form of sulphide, when that metal was present, was collected on filters which had themselves been previously tested for lead. The filters were incinerated in a muffle, and the ash afterwards fused with a slight excess of carbonate of soda. The fused mass was exhausted with water, and washed till the filtrate was found to be free from sulphuric acid. The insoluble residue from the samples of treacle, containing much sesquioxide of iron, was boiled for half an hour with concentrated nitric acid, and the solution, being diluted with water, was filtered, to separate some iron which was not dissolved. The filtrate, evaporated nearly to dryness, was diluted with water, and was precipitated by hydrosulphuric acid, after being observed to have a decided acid reaction.

The sulphate of lead was collected on Swedish filter paper, incinerated, dissolved in nitric acid, to which some distilled sulphuric acid was afterwards added. After evaporation the lead was weighed in the form of sulphate of lead. In some cases an appreciable quantity of copper appeared. Then the sulphate of lead and oxide of copper remaining after ignition were separated from each other by means of dilute nitric acid. The nitrate of copper being decanted off, the sulphate of lead remaining was weighed alone. The latter was finally reduced by the blowpipe, and the lead which it contains obtained in the metallic form.

The following official return of the consumption of treacle by individuals in certain localities was obtained, with the view of determining the quantity of lead that might be consumed in such cases, if treacle made by the patented process were used.

A Return of the Quantity of Treacle consumed by Individuals at the Prices herein named:—

Ravenhead—12 persons consumed.................. 6lbs. per week.
4 ditto ditto .... 2lbs. ditto.
Average for each individual .... ½lb. ditto.

Blakely, Middleton, and Alkrington—
In one family 3 children consume 3½lbs. per week.
Ditto ditto 3 ditto ditto 3 lbs. ditto.
Ditto ditto 2 adults ditto 2 lbs. ditto.
Ditto ditto 3 children ditto 3½lbs. ditto.
Ditto ditto 6 ditto ditto 7 lbs. ditto.
Ditto ditto 3 ditto ditto 3 lbs. ditto.
Average, 1lb. and $\frac{1}{10}$th each individual per week.

Bury (Lancashire)—87 individuals.................. 32½lbs. per week.
Each individual ....0.3735lb. ditto.

More consumed in hot weather, when they make what is called "Treacle hum."

Taking 4lbs. of treacle to contain a quantity of a soluble salt of lead, equivalent to 6.32 grains of sulphate of lead, as shown by the analysis of Professors Thomson, Graham, and Hofmann, one pound of treacle will contain 1.58 grain of sulphate of lead; therefore, according to the foregoing returns, each individual would consume weekly as follows:—

Ravenhead	0.79 grain
Blakely	1.67 "
Middleton..................................	1.84 "
Alkrington	1.75 "
Bury	0.59 "
Total.................	6.64 grains.

Average, 1.32 grain for each individual per week; or for the year, 68.64 grains for each person.

Minimum, 30.68 grains; maximum, 95.68 grains per year each person.

G. PHILLIPS, Surveying General Examiner.

Laboratory, Inland Revenue, July 5, 1850.

The Government having now ascertained the presence of lead in the sugar, and especially in the treacle, and having ascertained the consumption of treacle, applied for medical opinions as to the effects to be apprehended from the use of these substances.

Inland Revenue Office, Old Broad Street,
July 6, 1850.

GENTLEMEN,—An analysis of sugar, refined by the mode specified in Dr. John Scoffern's patent, has lately been undertaken by desire of the Government.

The gentlemen employed in that analysis were Dr. Thomson, Professor of Chemistry in the University of Glasgow; Mr. Graham, Professor of Chemistry in University College, London; and Dr. Hofmann, Professor of Chemistry in the Royal College of Chemistry, London.

I have received their report, dated 26th of June, and I am now desirous of ascertaining your opinion, as medical jurists and practitioners, as to the safety of consuming sugar, bastards, and treacle so prepared.

I therefore transmit the report to you, and a statement, signed by Mr. George Phillips, of the actual consumption of treacle in several of the manufacturing districts of Lancashire. This statement has been collected by persons having the best opportunities of information, and may be relied on as authentic.

I have to request your opinion on the results of the analysis and the quantities consumed.

I have the honour to be, very respectfully, Gentlemen,
Your most obedient Servant,
JOHN WOOD.

To Dr. Pereira, F.R.S., Physician to the London Hospital, and late Lecturer on Materia Medica.
Dr. Taylor, F.R.S., Lecturer on Chemistry and Medical Jurisprudence at Guy's Hospital.
Dr. Carpenter, F.R.S., Professor of Medical Jurisprudence in University College.

London, July 16, 1850.

SIR—In accordance with your request, that we should furnish you with our opinion "as to the safety of consumers of sugar, bastards, and treacle," prepared by the mode specified in Dr. John Scoffern's patent, the undersigned beg to make you the following report:—

As the basis of our opinion we have assumed the accuracy of the statements contained in two papers which you have furnished us, namely, a copy of a report by Messrs. Thomson, Graham, and Hofmann of the results of their chemical examination of the mode of refining sugar, described in the specification of Dr. John Scoffern, of date December 8, 1847; and also a return by Mr. G. Phillips of the quantity of treacle consumed by individuals of Ravenhead, Blakely, Middleton, Alkrington, and Bury (Lancashire).

From the chemical report it appears that the maximum and minimum quantities of sulphate of lead obtained from refined sugar, bastards, and treacle, obtained by Dr. Scoffern's process, were as follows:—

4lbs.	Maximum.	Minimum.
Refined sugar	1.05 grain............	.0 grain
Bastards	1.826 grain............	0.42 grain
Treacle	6.32 grains	0.87 grain

It further appears from Mr. G. Phillips's return, before quoted, that the consumption of treacle by 123 persons was 62½lbs—

			lbs. of treacle consumed per week.
Ravenhead	12	persons	6
	4	"	2
Blakely, Middleton, and Alkrington	18	children	20
	2	adults	2
Bury (Lancashire)	87	individuals	32½
Total	123	persons	62½ lbs.

The maximum and minimum quantity consumed per week is as follows :

	Maximum.	Minimum.
Treacle consumed per week by one person	1.66	0.3735

Assuming, therefore, that 4lbs. of treacle contain a quantity of metallic lead equivalent to 6.32 grains of the sulphate, it follows that the maximum and minimum quantity of lead consumed by one person per week and per year would be as follows :—

	Per Week.		Per Year.	
	Maximum.	Minimum.	Maximum.	Minimum.
Sulphate of lead consumed	1.843	0.590	95.836	30.68

Now it appears to us, that, for the purpose of our investigation, we ought to calculate the effect likely to be produced by a *maximum quantity* of lead taken in treacle.

Our inquiries therefore, will be directed to the effects likely to be produced by the ingestion of a quantity of lead equivalent to 1.843 grain weekly, or 95.836 grains annually of the sulphate.

We have, however, thought it desirable to calculate, in the first place, what quantities of metallic lead are equivalent to the above-mentioned quantities of the sulphate. Assuming 152 grains of sulphate of lead to contain 104 grains of metallic lead, it follows that 1.843 grain of sulphate of lead is equivalent to 1.261 grain of metallic lead, and that 95.836 grains of sulphate of lead are equivalent to 65.572 grains of metallic lead.

Our investigation, therefore, practically resolves itself into the inquiry whether 1.261 grain of metallic lead, contained in a salt of lead capable of becoming dissolved by the juices of the alimentary canal, swallowed weekly for probably many months, is capable of producing serious injury to health.

We have no hesitation in expressing our decided conviction that the weekly use of less than 1.261 grain of lead would be likely to prove highly injurious to health ; and in the course of a few months might give rise to alarming symptoms of poisoning.

Dr. H. Gueneau de Mussey, in his interesting "History of the Cases of Poisoning by Lead which lately occurred at Claremont," tells us, that the habitual use during seven months (namely, from March to the beginning of October, 1848) of water, containing, according to Dr. Hofmann's analysis, *one grain* of metallic lead in the gallon, gave rise to alarming and unequivocal symptoms of lead poisoning in thirteen persons (eleven men and two women) out of the thirty-eight inhabitants of the palace. Indeed, four of the patients manifested some symptoms of poisoning after five months' use of the water. This water was used in all culinary and table purposes, and, previously to the discovery of its deleterious character, even in the preparation of tisans and lavements.

We know not what might have been the average quantity of this water which was consumed by each individual daily, but if we assume that each person swallowed daily the lead contained in a quart of water, we should then have a quarter of a grain of metallic lead taken daily, or 1.75 grain weekly, or 38.25 grains in five months (153 days).

The weekly quantity of metallic lead assumed to be taken in this water is greater than that calculated to be taken in treacle, according to Mr. G. Phillips's return.

At the rate of 1.261 grain weekly, it would take 212 days, or about seven months, to introduce 31.25 grains of lead into the system.

It does not, as we conceive, fall within the objects of this Report to enter at length into the symptoms which arise from lead poisoning; but we may observe that the compounds of lead are well known to be most insidious in their action. When swallowed, they are absorbed, and accumulate in the system; hence, when taken in minute doses during a long period of time, they give rise to various alarming symptoms, which may end fatally, unless the cause be withdrawn.

Perhaps, the best test which we can apply to the solution of a question of this kind, is to inquire whether we, by ourselves or our families, would knowingly consume an article of food which would have the effect of transferring weekly into our bodies one grain and a half, or even one grain, of a compound of lead. Our answer is, assuredly not. If we could procure the article of food free from such contamination, we should reject that which contained this proportion of lead poison; and if we could not procure it in an uncontaminated state, we should prefer abandoning altogether the use of food which might be attended with injurious consequences to health. Even supposing that there were no facts to show that very minute doses of lead poison taken daily for many weeks may seriously endanger health, the risk is too great to be incurred.

For the reason above assigned, it is our opinion that the treacle produced by Dr. Scoffern's process cannot be used as a daily article of food in the quantities specified in the return, or even in smaller quantities, without exposing those who consume it to the risk of slow poisoning by lead.

GENERAL REMARKS ON THE PROCESS.

The results obtained by the Chemical Reporters show that samples of sugar, bastards, and treacle, manufactured with the greatest care by persons acquainted with Dr. Scoffern's process, do invariably contain a portion of lead, which is chiefly washed into the treacle. Hence the test and countertest advised in the process are not capable of showing that the sugar is free from lead, even when these tests are employed by experienced persons. If worked by inexperienced persons, a very large quantity of lead may remain in the syrups, and be diffused through the refined sugar, or carried into the treacle. Without the constant supervision of a skilful chemist, the public health would be greatly endangered by the general consumption of saccharine substances so prepared, and even under the supervision it would appear from the analysis of the samples that, while the consumers of refined sugar might possibly escape, the consumers of treacle would be liable to suffer, after the lapse of some weeks or months, from the usual effects of lead poison.

All that has hitherto been said refers to the application of sub-acetate of lead to the process of sugar refining. With regard to the question of its employment in the original extraction from cane juice, we have not the same satisfactory data afforded by quantitative analysis as those which have been supplied to us with regard to the former process. But it appears to us that all which we have said on this subject applies *à fortiori*, to the extraction of sugar from cane juice.

Further, if the refining process is carried on, not upon the ordinary raw sugars and molasses at present imported, but upon materials already charged with a noxious proportion of lead by the introduction of Dr. Scoffern's patent into the first manufacture, it may be fairly anticipated that the proportion of lead in the treacle, which is the residue of the double process, will be considerably larger than that found in the treacle of the present manufacture.

We are, Sir, yours respectfully,
JONATHAN PEREIRA,
ALFRED SWAINE TAYLOR,
WILLIAM BENJAMIN CARPENTER.

To John Wood, Esq., Chairman of Inland Revenue

These reports having been communicated to the patentee, counter-statements have been made with the view of proving that, should the sugar, made by Dr. Scoffern's process, contain any portion of lead, it must be in the state of sulphite, and that this salt of lead is perfectly innocuous. The following is the correspondence, which has been officially published, relating to this part of the subject :—

(*Copy.*)

From Dr. William Gregory, Professor of Chemistry, University, Edinburgh.

Edinburgh, April 22, 1850.

GENTLEMEN,—I have now continued my trials of the sulphite of lead on dogs and rabbits ever since I wrote last, with certain interruptions caused by the animals having been repeatedly stolen, so that I had to get new ones. A day or two after I wrote, a dog who was taking it, and had as yet exhibited no bad effects, became ill. I was a little puzzled, but I could not believe that the sulphite was the cause of it. On strict inquiry I found that he had the day before got loose, and entered the laboratory, where he was seen eating something out of a drawer with refuse, dyeing stuffs and liquors. This explained it; he recovered in two days, and again took the sulphite readily, without the slightest bad effect, for some weeks, when he was stolen. Another dog, who had taken it abundantly for about a fortnight, and was perfectly lively and well, was taken away by his owners, in order to be operated on under chloroform; but he got such a dose of it that he died on the spot. All my rabbits throve perfectly on food plastered daily with about three to five grains for each, and they were so well and fat that their appearance evidently tempted a thief, who three times succeeded in carrying them off. All these animals made no difficulty about taking the sulphite, and, as far as I could see, it did them no harm whatever. I think myself, therefore, now justified in declaring my opinion that the sulphite of lead, even when taken daily for weeks in considerable quantity, is perfectly innocuous, and as harmless *as so much chalk would be*. This, indeed, might be predicted from its excessive insolubility and very stable nature, arising from the powerful affinity of sulphurous acid for oxide of lead—this prevents the formation of carbonate (white lead), which is truly the poisonous lead-compound. Even the *sulphate*, which is not by any means so insoluble as the *sulphite*, is innocuous when pure. The sulphite, therefore, is *à fortiori* harmless. I should have no objection personally to use the sugar made by Dr. Scoffern's process, even if some *sulphite* were accidentally mixed with it. Of course, if this did not happen, there could be no pretence for even imaginary danger, when the sulphurous acid has been properly used, to separate any lead that might be present as acetate.

You are at liberty to make what use you please of the whole or any part of this letter.
I remain, &c.,
Professor of Chemistry in the University of Edinburgh.
(Signed) WILLIAM GREGORY.

Messrs. Smith and Charles, London.

We may here refer to the opinion expressed by Dr. Christison, at a meeting of the British Association, which is at variance with that of Dr. Gregory. (See the last Number of this Journal, p. 150.)

(*Copy.*)

LETTER FROM PROFESSOR BRANDE.

Royal Mint, July 27, 1850.

GENTLEMEN,—In compliance with your request, I have perused the report of Messrs. Thomson, Graham, and Hofmann, and can see nothing in it to shake my confidence in the merits of Dr. Scoffern's process, when conducted with common skill and attention.

Those gentlemen state that they have detected lead in moist sugar from the West Indies, and that they have also found it in treacle prepared by the old and usual process, and they refer its presence in these cases to white paint, and to leaden pipes and cisterns. They did not detect lead in loaf sugar from the same factory in which the treacle did contain lead. But as they appear to have examined the goods of one house only, I think that further inquiry is necessary before any general conclusions can be safely arrived at, respecting the existence or non-existence of traces of lead in the different varieties of sugar in common use.

Of nine samples of loaf sugar, prepared according to Scoffern's patent, they found traces of lead in eight—its average quantity in the nine samples, amounting to the infinitessimal proportion of 0.05 of a grain in each pound of the sugar.

As respects the treacle resulting from Scoffern's manufacture, it appears that the only fair sample examined, namely, that marked "for consumption," contained 0.595 of a grain of lead in each four pounds, or 0.149 of a grain of lead in each pound of treacle; and that a similar and even larger quantity of lead was found in the treacle resulting from the ordinary manufacture.

Messrs. Thomson, Graham, and Hofmann appear, however, to have examined one sample only of such ordinary treacle, namely, that obtained at the factory where the loaves were derived; but I think that both loaves and treacle coming from other sources should also have been examined, for I believe that, in the low sugars and treacle of commerce, lead and copper are not uncommon ingredients.

An essential point has also been overlooked in Messrs. Thomson, Graham, and Hofmann's Report, namely, the *state* in which lead exists in ordinary, as compared with Scoffern's treacle; in the former it is said to be found chiefly as carbonate of lead, which is poisonous; whilst in the latter it is in the state of sulphite, which, according to the experiments of Dr. Gregory is innocuous. These are points which, having important bearings upon the question at issue, require experimental investigation.

I am glad to see that my former opinion respecting the insolubility of sulphite of lead, and the possibility of the separation of all traces of lead from syrup by means of sulphurous acid, are admitted by Messrs. Thomson, Graham, and Hofmann, because these, in conjunction with the inertness of sulphite of lead, are the points on which the safety of Scoffern's process depends.

That the objects attained by Scoffern's process are equally attainable by other perfectly unobjectionable methods, I cannot admit; nor do I think that this ingenious and effective invention should be deprecated merely because it involves the use of a salt of lead, leaden pipes, pumps, and cisterns, and all kinds of copper vessels might upon similar grounds be interdicted. In respect to the Medical Report of Drs. Pereira, Taylor, and Carpenter, it seems to me that those gentlemen found their inferences as to the mischievous character of Scoffern's process upon two data, neither of which is equitable; first, they adopt the quantity of lead contained in a sample of treacle avowedly impure, and delivered as such from the sugar-house, as the basis of their calculations; and, secondly, they assume that the sulphite is a poisonous *salt* of lead, and that it cannot be excluded from the sugar.

I must now conclude by repeating my conviction that, with common care and attention, sugar, in a wholesale way, may be made free from lead by Scoffern's process; and that the presence of traces of sulphite of lead in his treacle is of less consequence than the presence of traces of carbonate of lead, which I believe to be very common in all treacle.

If, on the contrary, more extended experience in Scoffern's process should prove that, with ordinary precaution, sugar free from lead cannot be produced by it on the large scale, and the sulphite of lead is a poisonous salt, then I think that common sense would suggest its abandonment.

I remain, Gentlemen, faithfully yours,
(Signed) WILLIAM THOMAS BRANDE.
Messrs. Coote, Browne, & Co., King's Arms Yard.

TO THE RIGHT HON. SIR CHARLES WOOD, BART., CHANCELLOR OF THE EXCHEQUER.

SIR,—On my return to England yesterday, the report of Drs. Hofmann, Thomson, and Professor Graham, together with the reply of Messrs. Coote, Browne, and Co., and the letter of Mr. Brande to those gentlemen, were put into my hands.

The statemens contained in these memorials are so pertinent, that my own comments will be but few.

Although it is perfectly true, as your investigators allege, that my process, properly conducted, is capable of absolutely removing lead which may exist dissolved in sugar solutions, there exists a still more powerful guarantee of its safety in the fact that it unerringly converts all soluble lead present into an insoluble, and, therefore, perfectly innocuous condition; *hence the ultimate issue is a physiological one, to be decided by experiments on living animals.*

Dr. Gregory, Professor of Chemistry in the University of Edinburgh, has, after prolonged experiments on animals, pronounced the sulphite of lead *to be as harmless as chalk*; and I myself, and some friends conversant with the fact, are ready to demonstrate the harmlessness of sulphite of lead by ingesting for any time so much of this substance as an equal number of other individuals will ingest chalk. *I am ready, moreover, to expose my own children to the same test.*

In Spain, the British Vice-Consul of Motril has for a considerable time used sugar in his family made by my process *without the second filtration*, and hence, which contained sulphite of lead in the maximum proportion which could have been present under the grossest possible mismanagement.

This was done purposely, and after the receipt of Dr. Gregory's communication.

The physiological fact which doubly guarantees the safety of my process, *is wholly disregarded by your investigators*, who have committed the grave error of converting all the lead present, in whatever condition, into the sulphate, and estimating it as such, although Dr. Taylor, directly or indirectly, the only writer on poisons amongst your investigators, quotes experiments of Orfila to prove that sulphate of lead, being insoluble, is not poisonous, and Dr. Gregory has proved that the sulphite is even more insoluble than the sulphate.

Your investigators limit their remarks to the refinery operations; as regards the case of cane juice, the only experimental testimony brought before your consideration appears to be that of Dr. Shier. With respect to this gentleman's report, I will solicit your attention to the fact that it admits the complete separation of lead as indicated by the test, but subsequently propounds the discovery of a very minute quantity of lead (form not mentioned) in the results. Now, subsequently to testing, and before the elimination of results, the sugar solution, *to Dr. Shier's knowledge, came very largely in contact with vessels painted with red lead;* hence the discovery of a very minute quantity of lead may, with the highest degree of probability, be attributed to this source.

Your investigators disapprove of the use of a poison in the preparation of an article of food when it can be avoided, a proposition which, if rigidly accepted, would not admit of the use of lime in the ordinary process of sugar manufacture.

Perhaps it may not be deemed irrelevant for me to remark that the result of my operations on Spanish cane-juice on the large scale has been the production of upwards of twenty per cent. of sugar in lieu of the six or seven per cent. as extracted by the ordinary process of manufacture, and this without any difficulty whatever. I am ready to furnish samples of this sugar, or to exhibit the workings themselves to any properly-qualified delegate.

I would, therefore, ask whether a process yielding an increase of 200 per cent. should be impeded in deference to anything short of the most precise testimony as to the danger which it involves.

I will now draw your attention to the following facts:—

1. That whilst all lead which may be present in sugars prepared by the ordinary process is necessary soluble, or in the form of carbonate, in both cases poisonous, all lead present in sugars made by my process, and as the result of that process is necessarily insoluble, and therefore innocuous.

2. That if small traces of lead in any form are to be regarded as dangerous when present in sugar or treacle, there is not a refiner in the United Kingdom whose goods will not be subject to condemnation.

Finally, I solicit another and more extensive chemical examination not only of my sugars, but of sugars from various refineries to be indicated by me with myself, or one or more Chemists deputed by me, present to check results; these results to be published, as well as the form of analysis which led to them, care being taken to indicate the precise state in which lead, if any, was found.

I solicit a physiological investigation of the effects of sulphite of lead on the human economy, and reiterate my offer of myself, my children, and many scientific friends to take any dose of sulphite of lead, and for any time that any equal number of individuals shall take equal doses of chalk.

I have the honour to be, Sir,
Your most obedient humble servant,
(Signed) JOHN SCOFFERN.

(*Memorandum*).

A note was this day received by Dr. Scoffern from Mr. Arbuthnot, on behalf of the Chancellor of the Exchequer, dated August 9, 1850, stating that it was the intention of Her Majesty's Government to lay on the table of the House of Commons all the papers and correspondence connected with the investigation into Dr. Scoffern's process, together with letters received from Dr. Scoffern and his solicitor.

This note has unfortunately been mislaid, but the above memorandum contains the substance of it.

General Agent for Dr. Scoffern's Patent.

London, August 10, 1850.

TO THE RIGHT HON. SIR C. WOOD, BART., CHANCELLOR OF THE EXCHEQUER.

74, *Old Broad Street, London, Aug.* 10, 1850.

SIR,—I have this moment received your communication, through Mr. Arbuthnot, of the 9th inst., stating that it is your intention to lay the whole of the papers relative to my patent before the House of Commons.

I now take the liberty of reminding you that the letters of Professor Brande, of Messrs. Coote, Browne, and Co., and of myself, have fully established the fact that the reports of the chemical and medical commissioners (appointed by yourself without any communication with me, or affording me the slightest opportunity of guarding them against any error which their mode of procedure might involve) are erroneous in several respects.

1. They have chosen as their standard of comparison the sugars and treacle only of one manufacturer by the old process, selected by themselves.

2. They have chosen, on my part, a sample of sugar and treacle for comparison which was put before them as the result of first and imperfect machinery, and which they knew had been corrected before the sample was furnished.

3. They had not distinguished between lead in a noxious and lead in an innocent form.

4. They have not stated their process of analysis with such precision as to enable any Chemist to judge whether their results are entitled to confidence.

5. Finally, they have not made any physiological experiments as to the nature of sulphite of lead, although the certificate of Dr. Gregory as to the innocuity of that substance had been furnished to them.

I protest, therefore, against such Report being issued; the effect of which may be to prejudice any process which, if thoroughly examined, will not only be found perfectly safe, but more safe than the old process when conducted by the ordinary means of leaden tanks and pipes.

I solicit any fair and extended investigation; but emphatically protest against any interference with my process on the strength of the irregular, unchemical, and imperfect Report now before you.

I have the honour to be, Sir, your obedient Servant,

John Scoffern.

We think that Dr. Gregory and Mr. Brande have been much too hasty in coming to a conclusion that sulphite of lead might be taken in small and constantly repeated doses without any ill effects, seeing that this opinion is principally founded upon the great insolubility of the sulphite. It has been proved by Mensonides and others,* that insoluble substances, such as globules of mercury, and particles of sulphur, charcoal and starch, are absorbed and carried into the blood. Many substances very insoluble in water, such as calomel, carbonate of lead, &c., are nevertheless known to possess considerable activity when taken into the stomach; others, such as sulphate of lead, when applied to the surface of the skin.† In these cases the substances are, no doubt, changed by the animal fluids, and are thus rendered active. The very insoluble sulphate of lead is rendered to a certain extent soluble by the alkaline chlorides; and, until it can be shown that sulphite of lead is proof against decomposition of this kind its introduction into an every-day article of food must be considered as a very hazardous practice.

POISONOUS EFFECTS OF SULPHATE OF LEAD.

BY M. C. FLANDIN.

Some years ago M. de Ruolz proposed to replace the carbonate of lead by sulphate of lead. It was thought that this latter salt, being insoluble and more stable than the carbonate, would be less easily reduced or decomposed by the powers of the organism. This presumption was strengthened by the fact that a workman engaged in the manufacture of sulphate of lead, accidentally swallowed more than fifteen grains of the salt without experiencing any ill effects. M. de Ruolz, in communicating to me this result and his hopes, requested that I would try the action of sulphate of lead on some animals. In order to assume, as far as possible, the conditions to which the workmen engaged in the white lead works are exposed, it appeared to me desirable to apply the metallic salts by means of friction over the skin.

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* *Medical Gazette*, June 5, 1850, page 36.

† See the next article.

I had the hair shaved from the skin of a dog, and about seventy grains of an ointment, composed of equal parts of lard and sulphate of lead, rubbed in every day. After the tenth day the animal was observed to be affected as if under the influence of the commencements of intoxication. He became constipated, rejected his food, and was evidently ill. He rapidly got worse, and died on the twenty-second day, less than two ounces of sulphate of lead having been used in the frictions. Analysis indicated the presence of the poisonous metal in the organs, and especially in the liver. Soon after this experiment the foreman in M. de Ruolz's manufactory was attacked with lead colic, of which he died. M. de Ruolz was the first to renounce his faith in the harmlessness of sulphate of lead, and to relinquish its manufacture.—*Comptes Rendus.*

IS OXIDE OF ZINC POISONOUS ?

BY M. C. FLANDIN.

Much interest has been felt in the manufacture, recently introduced by M. Leclaire, which has for its object the substitution of oxide of zinc for carbonate of lead as a pigment. This appears a desirable change in reference to a manufacture which has been classed among the most unhealthy, and which, notwithstanding the ameliorations which have been from time to time effected in it, has continued to carry off too many victims. But it had to be determined how far oxide of zinc could be made and used on the large scale without injury to the health of those exposed to its influence; and whether the slow and repeated absorption of compounds of zinc was not to be feared as well as that of compounds of lead. These questions can only be decided by time and the test of experience, to which this in common with other new manufactures must be submitted. In the mean time, however, the following results of some experiments are given in confirmation of the favourable opinion which has been generally formed with reference to the new white pigment of M. Leclaire.

When M. Leclaire opened his establishment for the manufacture, on a commercial scale, of zinc white, I was one of those appointed to examine the new product, and to point out the proper measures to be adopted for the protection of the workmen. Referring back to the experiments I had made with the sulphate of lead, I determined to submit the zinc white to a similar trial. I procured a young dog, from part of whose body the hair was shaved, and over this part about seventy grains of ointment, composed of equal parts of lard and zinc white, was rubbed daily. Ten, twenty, and thirty days passed, the ointment being regularly rubbed in every twenty-four hours, but the health of the animal was not in the least affected. He was purged, but only once. So far from his losing his appetite or appearing ill, he fattened on his good living.

After this experiment the animal was kept for ten days without further treatment, during which time he continued in uninterrupted good health. He was then subjected to another experiment in which ointment composed of equal parts of lard and white lead (carbonate of lead) was applied precisely as in the other trials. In ten days or rather less the dog became ill and lost his appetite. All the symptoms of the poisoning came on gradually, and death took place on the twenty-third day, less than two ounces of carbonate of lead having been used.—*Comptes Rendus.*

POISONOUS EFFECTS OF OXIDE OF ZINC.

BY DR. BOUVIER,
of the Hôpital Beaujon.

A MAN, aged forty-two, a labourer, entered on 19th April, with all the symptoms of metallic colic. He had been employed for the fifteen previous days at a white colour manufactory, along with five other workmen, in barrelling oxide of zinc, and in repairing casks which had contained that substance, during which operation they were exposed to an atmosphere loaded with the powder of the oxide. From the commencement of their work he and his comrades experienced colic and a repugnance to food, and the wine and brandy which they took to excite their appetite were disgusting to them, and did not remove the clammy taste which they had constantly in their mouths. This man could not continue long at work. After ten days of this employment he was seized with vomiting, severe colic, accompanied by constipation, which persisted and increased in intensity so much that he rolled on the floor in agony. On the day of admission he continued to vomit, and to suffer severe abdominal pain. The vomited matters were bilious, and he rejected all his food almost immediately after swallowing it; he had had no stool for five days, the belly otherwise was natural, the tongue whitish; he had no appetite, was free from fever, but was sleepless. The next day, 20th April, the bowels were opened by two ounces of sulphate of magnesia and the painter's purgative clyster, as used in La Charité (this consists of twelve ounces of wine with six of oil). The free evacuation of the bowels and the administration of 2½ grs. of opium were followed by cessation of vomiting and diminution of the pain. From this time to 26th April, after having taken from six to twelve grs. of gamboge daily, and using frequent clysters and medicated baths, he became convalescent, and was dismissed cured on 4th May.

From the whole history of the case, there appeared to be no doubt that this man suffered from a genuine zinc colic. To ascertain that it was really oxide of zinc which had caused the illness, M. Bouvier collected, by washing the surface of his body, the metallic particles which adhere to it, and found them to consist of oxide of zinc. We are not entitled from this to say that the oxide of zinc is as noxious as white lead; but it shows, at least, that some precautions require to be taken by those who work with it in order to preserve their health.—*Comptes Rendus.*

[We think further evidence is necessary to prove that the oxide of zinc was pure.—ED.]

ON THE USE OF SULPHURET OF ARSENICUM AS A DEPILATORY.

BY M. FELIX BOUDET.

THE numerous cases of poisoning in which arsenic has been used, caused the legislature, in 1845 and 1846, to impose certain restrictions upon the sale of this substance. In the latter year, a royal ordonnance interdicted under severe penalties,

1st. The sale of arsenic and its compounds for other purposes than its use in medicine, unless in combination with other substances.

2d. The sale and use of arsenic and its compounds for the steeping of grain, the embalming of bodies, and the destruction of insects.

In consequence of these wise measures, the retail sale of arsenious acid has been suppressed, and this terrible poison, which not long since was in the hands of every agriculturist, is no longer entrusted to such hands. Science has bestowed a great benefit in depriving the perpetrators of crime of this formidable weapon. But there are other arsenical products almost equal in power to arsenious acid, which are still in use, such as the sulphurets of arsenic.

One of these, under the name of *orpin*, is used in a particular process for preparing sheep-skins. This is not orpiment, as its name would seem to indicate, but artificial or false realgar, which, according to Guibourt, contains one-and-a-half per cent. of arsenious acid, and is a tolerably active poison.

The other, under the name of *yellow sulphuret of arsenic*, enters into the composition of indigo vats, and forms one of the constituents of depilatory powders and paste. This is the yellow arsenic or false orpiment, which is prepared in Germany by subliming arsenious acid with sulphur. It contains 94 per cent. of arsenious acid, and only six per cent. of sulphuret of arsenic. It is almost as poisonous as the arsenious acid itself. The annual importation of these two sulphurets into France, exceeds 660,000 pounds weight.

In the dressing of skins, the use of orpin has only been introduced during the last twenty years. It causes the wool to be detached from the skin, without plunging it into a bath of lime, as was the practice formerly, and in this respect it has been found very serviceable.

Having had occasion to direct my attention to some applications of chemistry to the art of tanning, and to substitute soda for lime in that process, I was also led to inquire into the use of orpin. It has appeared to me, for some time past, that this subject involved an important consideration in a sanitary point of view.

The poisonous properties of sulphuret of arsenic, the facility with which it has been obtained by retail consumers, the great quantity of it which, in Paris, has been daily poured into the river Bievre, are circumstances calculated to create serious inquietude. Indeed, I have lately heard from M. Bussy, that in 1846, whilst making some experiments relating to a Report to a Commission of Health, he had obtained arsenical stains by Marsh's apparatus, from the mud procured from the bottom of the river Bievre, and also from that of the Seine, taken from beneath the bridge of Austerlitz. It is much to be desired that the sulphuret of arsenic could be replaced, as a depilatory, by some other less dangerous agent.

Hitherto the depilatory processes had not been submitted to any scientific investigation; and if, according to Berzelius, we ought to attribute the effects of the mixture of lime and sulphuret of arsenic to the solubility of the skins in caustic alkali, this question, upon which doubt is thrown by this illustrious Chemist, leaves unexplained the preference given to the above mixture over the use of lime alone.

I had, therefore, to ascertain which was really the depilatory agent, and whether the arsenic performed an important part in the process.

In order to solve this problem, I examined separately the properties of each of the compounds which might exist or be produced in the mixture of sulphuret of arsenic, lime and water, which was applied to sheep-skins for the purpose of removing the wool; and I thus discovered that neither the lime, nor the arsenious acid, nor the sulphuret of arsenic, had any notable influence on the result, but that this depended on the action of nascent sulphuret of calcium formed by the reaction of lime on the sulphuret of arsenic.

I proved, indeed, that sulphuret of calcium acts powerfully as a depilatory when employed alone, and that it partakes of this property in common with the monosulphurets of sodium, of barium, and of strontium.

These observations naturally suggested the substitution of sulphuret of sodium, or hydrosulphate of soda for the sulphuret of arsenic, the former having been already introduced as a therapeutical agent, and especially in the fabrication of mineral waters and sulphur baths. This new agent succeeded beyond my hopes, and gave more rapid results than the orpin itself; so much so that only a few hours after its application to a sheep-skin I could without effort detach the wool in a single piece.

Nothing could, therefore, be easier than to substitute sulphuret of sodium for sulphuret of arsenic in depilatory processes. The expense of the processes would not be thereby increased, and both with reference to the health of the workmen engaged in making, powdering, and applying the orpin, and the security of the public who are interested in restricting the use of substances which might be productive of poisonous effects, such a substitution would be very desirable.

Encouraged by this first success, my attention was directed to the depilatory powders and pastes, which are extensively used in the East, and not unfrequently in France, for removing superfluous hairs.

The Turkish *rusma*, and the depilatories of Plenck, of Colley, and of Delcroix, may be all described as mixtures in different proportions of lime and sulphuret of arsenic, to which some add gum, and others starch, and sometimes a little caustic alkali; and these preparations are applied to the skin after being made into a paste with a little water.

These means do not always answer the intended purpose well, and their adoption is subject to serious evils.

In fact, the yellow sulphuret of arsenic being, as has been stated, little else than arsenious acid, the application to the naked skin of so energetic an agent cannot be free from danger. Even the preparation of these depilatory powders is fraught with danger, as it is generally performed by persons wholly unacquainted with chemical or pharmaceutical knowledge.

But my investigations have shown that in all these depilatories, as well as in those used by the leather dressers, the arsenious acid has no influence in promoting the required effect, which might be more rapidly and certainly produced by the use of a paste of sulphuret of sodium and lime than with any one of the arsenical compounds which have been hitherto used.

The following is the formula which I propose:—

Take of

Sulphuret of Sodium, or Hydrosulphate of Soda, crystallized	3 parts	
Quick Lime, in powder	10 "	
Starch	10 "	Mix.

This powder, mixed with a little water, and applied over the skin, acts so rapidly as a depilatory, that if it be removed in a minute or two after its application, by means of a wooden knife, the surface of the skin will be entirely deprived of hair. By this process the removal of the hair becomes so simple, rapid, and safe an operation, that it will probably supersede the use of the razor in many cases. Hitherto, the tediousness and uncertainty of the process, and above all the poisonous properties of the agents employed as depilatories have greatly limited their use, but it is easy to foresee the numerous cases to which a process made easy and safe might be applied. Independently of the advantages which it presents in the removal of superfluous hair, may it not be of great service to medical men and surgeons in connexion with the application of blisters or epithems, and also in certain operations?

It may be applied to parts the most delicate as well as irregular, and to surfaces either limited or extended, and it is only after several days that the hair begins to reappear.—*Journal de Pharmacie.*

ON THE MANUFACTURE OF PYROLIGNOUS ACID, PYROXYLIC SPIRIT, OR WOOD NAPHTHA, AND THE COMMERCIAL ACETATES OF LIME, SODA, AND LEAD, AND ACETIC ACID.

(*Continued from page* 139.)

PART VI.—*Manufacture of the Acetate of Soda.*—The cold concentrated solution of acetate of lime (which it is desirable should be made with distilled acid) is to be treated with a concentrated *filtered* solution of sulphate of soda, specific gravity about 1.250 temperature 98°, and agitated well by machinery, if convenient, during the precipitation of the sulphate of lime, till a little of the liquor from the decomposing vessel in which this operation is conducted will not show any precipitate on the addition of a solution of sulphate of soda in a test-tube. When this takes place, the contents of the decomposing vessel must be run on to a back, and then filtered into a cistern. Two of these backs will be required if the manufacture is conducted on a large scale, each furnished with a cistern, as it will require a good deal of washing to get all the acetate of soda from the sulphate of lime; they are to be furnished with false bottoms, and filters of stout twilled flannel. It is immaterial whether they are made square or round; the former is most convenient where it is desirable to economise room; each ought to communicate with *both* cisterns, so that when one back has ceased to pour strong liquor into one cistern the pipe may be stopped with a plug, and that communicating with the other cistern opened for receiving the washings of the backs. It may be ascertained when the precipitate is sufficiently washed by the taste of the liquor running away from it into the weak liquor cistern, when it is tasteless or nearly so, the sulphate of lime must be dug off with a wooden spade or shovel (iron is apt to cut the flannel), the back is then ready for another batch from the decomposing vessel. The liquor is now to be pumped from the cisterns into the iron pans, which ought to be so cast that they may offer as much heated surface as possible, and yet be not too large for a man to keep their contents in a state of brisk agitation with an iron stirrer broad and flat at the end. As it approaches dryness the temperature should not much exceed 500°, otherwise the acetate will be decomposed and converted into carbonate. Great nicety is required in this part of the manipulation, which depends entirely on the skill of the workman. When the mass is in quiet fusion, and there is no frothing up, the process is usually finished. Having thus dissipated the tar, the dry acetate may either be at once converted into acetic acid, or dissolved and crystallised; it is more soluble in the latter condition. It is most conveniently dissolved in a large cylindrical lead vessel, heated by shooting steam into it. When the solution is completed, it may be run through a flannel filter into the top of a course of steamers, furnished with coils of three-quarter inch lead pipe. These vessels are made of four pound sheet lead cased in boards. The best size is about twenty-four feet long, four feet wide, and about nine inches deep. The pipe should be coiled from one end to the other, and go up and down about three times. Too much pipe cannot be used, as the rapidity of the evaporation depends upon the quantity employed. As the evaporation proceeds, the liquor ought to be syphoned from the top to the second, and afterwards to the third steamer, and thus make room for more bulky weakly liquor; from the dissolving lead when a pellicle appears on its surface, it should be syphoned off into leads, and left for a couple or three days (according to the season) to crystallise. These leads need not be of heavier metal than four pounds, and made four feet long, two feet wide, and nine inches deep, but their form must depend entirely upon the size of the crystals required. Should they be wanted larger than can be obtained in the above, the leads must be deeper, packed in sawdust, and allowed to stand a longer time. When the crystallisation is complete, the mother-liquor must be taken from the crystals and emptied into the dissolving lead, and with the addition of two or three times its weight of water, used in dissolving fresh fused salt from the torrifying-pans ; the crystal must then be cut out of the leads, and thrown into a conical-shaped drainer and well washed. The liquor caught from the drainer must be put into the dissolving lead also. The crystals are now to be removed from the drainer to the drying-stove, where, after having been a few hours on the shelves, they should be packed in casks, and the sooner they are sold or used the better, as by keeping a loss of weight is sustained by deliquescence. The following process has been employed in the Cornbrook Works, near Manchester, under the able superintendence of Mr. A. P. Halliday:—

The rectified pyrolignous acid is saturated with lime, and the resulting solution of acetate of lime boiled down to specific gravity 1.200. This solution is now dosed with sulphate of soda, obtained from the decomposition of acetate of soda by sulphuric acid, until there is no further precipitate ; sulphate of lime then falls down, and acetate of soda remains in solution. The sulphate of lime is thrown upon stone filters, twelve ft. by six ft., and washed with water until the solution comes off so weak as not to be sufficient to afford remuneration for the expenses of labour, time, and fuel. The solution of acetate of soda along with the washings of the sulphate of lime, is next boiled down in iron pots, six ft. long by three ft. deep, cold set, until its specific gravity reaches 1.300. During the evaporation, the excess of sulphate of soda is fished up in ladles, pierced full of holes, and the salt laid on drainers suspended over the pot from which it had been raised. The solution at 1.300 specific gravity, is allowed to settle over night, and then drawn off to crystallize. The crystals are dissolved in dilute pyrolignous acid, and the solution at 1.270 drawn off after settling for a fresh crystallization ; the crystals are again dissolved, drawn off at specific gravity 1.500, dried and fused. The solution of fused salt is evaporated down, crystallized, and the crystals again dried and fused, and the fused salt allowed to flow out on an iron plate, where it becomes solid, and is afterwards broken up and dissolved in water. This solution when dosed with sulphuric acid, yields pure acetic acid. Sometimes the sulphate of soda is dissolved in the crude acid, and the chalk or lime subsequently added, a portion of fuel required for evaporation is thus saved. The most economical plan however, is that of saturating the acid liquor with sulphuret of sodium, as recommended by Turner, the only objection to its employment arising from the sulphuretted hydrogen evolved in the process, which has been known to affect individuals living upwards of two miles from the works where the process was in use. The double decomposition process above described ; is by no means a satisfactory one. The sulphate of lime resulting from the decomposition carries some of the salt away with it by direct combination it also robs us indirectly, inasmuch as we cannot wash it so as to take away all the acetate of soda, on account of the fuel required to evaporate the water used. In decomposing the acetate of lime by sulphate of soda, there is more delicacy required than workmen find convenient, the consequence is that there generally exists in the acetate of soda solution, either acetate of lime or sulphate of soda ; the latter is removed by boiling out, but the former runs the crystals, as the workmen call it, that is, prevents crystallization. This happens not unfrequently. Not more than one ton of acetate of soda is usually obtained from a ton of acetate of lime, and oftentimes a much less quantity.

In some manufactories of acetate of soda, the salt is not made to undergo igneous fusion ; but is purified from all extraneous matters by repeated crystallizations and filtrations through animal charcoal, previously well washed with dilute hydrochloric acid. Care should be taken that the solution of the fused salt has not a greater specific gravity than 1.116, otherwise the carbonaceous matter with which it is mixed will not settle, the solution should then be allowed to settle for twelve hours, the clear liquor poured off, evaporated to 1.250, and put to crystallize.

Mitscherlich recommends that the solution of acetate of lime employed should be of specific gravity 1.116; and that the solution of acetate of soda be evaporated to 1.230, or 1.240, and then put aside to crystallize. Another process is that of neutralizing the acid liquor with soda-ash; this is no doubt the most convenient process, but not the most economical.

(*To be continued*).

ON THE SAFFRON OF THE EAST.

BY X. LANDERER, OF ATHENS.

On the Continent, as well as on the islands of the Archipelago, the stigmata of *Crocus Spruneri*, *sativus*, *vernus*, *luteus*, and *variegatus* are gathered and sold as saffron (*Safora*). In the whole of Greece, about 30 to 40 pounds are annually gathered of it; but much more is brought from Macedonia and Thracia, where the saffron is said to be taken from the *Crocus aureus*, but mixed with the petals of *Crocus* and *Calendula*. It is sold in the bazaars of Smyrna, Thessalonica, and Gallipolis. A large quantity of saffron, about 30,000 litres annually, is brought by Persian small dealers to the so-called Misir-bazaars in Constantinople, *i. e.* the bazaars where all the products from the interior of Asia Minor, from Egypt, and from the Caucasus are sold.

AMOMUM GRANUM PARADISI; OR HAMANA OR ARNANA.

BY X. LANDERER.

By this name are called, in the bazaars of Constantinople, the seeds of Amomum granum Paradisi, which are used as nerve-strengtheners and in the form of an electuary against colic. The decoction is also used in Turkey for augmenting the acridity of white pepper.

OIL-BATHS.

BY X. LANDERER.

These are used in the East as preservatives against the plague, and as a remedy against the complaints of the spleen and physema. They are taken cold, the patient remaining in the bath during half an hour, then slightly washing himself and dressing. In some Turkish islands aromatic plants are added to them.—*Pharm. Central Blatt*, No. 34, 1850, p. 544.

REPORT ADDRESSED TO THE MINISTER OF PUBLIC INSTRUCTION, ON THE ORGANIZATION OF THE SCHOOLS OF PHARMACY IN FRANCE.

By a resolution dated the 6th of this month, you have done us the honour to appoint us a Commission* to examine "whether the present organization of the Schools of Pharmacy be not susceptible of some modifications, and especially if the number of Chairs in these Schools might not be reduced."

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* The Commission was composed of:
Thenard, Chancellor of the University, President.
Maissiat, Representative of the People.
Orfila, "Conseiller titulaire" of the University.
Berard, Notary of the Faculty of Medicine of Paris.
Bussy, Director of the Superior School of Pharmacy of Paris.
Persoz, Director of the Superior School of Pharmacy at Strasbourg.
Milne Edwards, Notary of the Faculty of Sciences in Paris (*Secretary*).
Chevreuil, Member of the Institut, Professor at the Museum of Natural History.
De Jussieu, Member of the Institut, Professor of the Faculty of Sciences, Paris.

We have maturely considered the grave questions submitted to us. Before commencing our reply, we beg leave to state the grounds on which our judgment is founded ; and in order to arrange the facts clearly, we think it right to premise by a concise notice of the principal legislative enactments on the practice of Pharmacy in France.

The right to prepare and sell medicines, is regulated by the law of the 21st germinal, of the 11th year, and is entrusted to three classes of persons:

1st. *Herborists*, who are authorised to sell medicinal plants and simple drugs, but who can neither prepare nor sell compounded medicines.

2d. *Officers of Health* (officiers de santé) who, in districts in which there is no Pharmacien, are permitted to supply the sick with simple or compound medicines, but cannot keep an open or public shop.

3d. *Pharmaciens*, who have the exclusive right to open shops for the preparation and sale of compound medicines.

Aspirants to the title of Pharmacien, are obliged to prove their qualification to practise their art, and must give evidence of certain literary, scientific, and special knowledge. The test to which they are submitted, ought to be always and everywhere of the same order. But they may be subjected to the judgment of two sorts of tribunals, namely the Schools of Pharmacy and Medical Boards, which sit in each department in which there is not a special school.

The diploma conferred by a School of Pharmacy gives the right to open a shop in any part of France. The licence obtained from a Medical Board is only valid within the limits of the department for which it was granted.

There exist, therefore, according to law, two classes of Pharmaciens, one class possessing a local, the other a general qualification. But as the profession is stationary, and the Pharmacien before he has completed his studies, almost always knows where he intends to establish himself, and in case of changing his locality, he can easily obtain a fresh local licence; this distinction has no importance in practice. The title is the same for Pharmaciens of the first and second class, the demands of the examiners are supposed to be the same for both, and the difference which distinguishes them consists chiefly in the manner in which the requisite knowledge has been acquired by the candidates.

Every aspirant to the title of Pharmacien, must, according to the law of September 27, 1840, prove his literary qualification by the possession of a diploma of bachelor in letters, and he must have practised his art in a shop for a certain number of years. For pupils of the School of Pharmacy, this period is three years, during which time the candidates pursue their scientific and special studies in these establishments. The Pharmaciens of the second class, on the contrary, do not generally receive any methodical public instruction—some supply the want of special instruction in the best way they can, and take advantage of a clause in the law which enables them to dispense with regular studies on condition of practising pharmacy for eight years in a public shop, others attend for a year or two the courses of lectures in the secondary schools of medicine, this forming a portion of the above period.

Thus, the intervention of Schools of Pharmacy is only necessary for those students who wish to establish themselves in a province in which an institution of this kind exists ; the other pupils are not obliged to attend either to complete their knowledge or to test their capacity, and if a certain number attend the schools in preference to remaining in a shop near the residence of their parents, it is because the instruction thence derived presents in their opinion considerable advantages. To judge of the utility of these schools, let us examine what are the qualifications requisite in a good Pharmacien, and what are the best means of acquiring them.

Society should require from the Pharmacien various accomplishments, but especially relating to two classes of facts—first, the characters and properties of substances, whether medicinal or toxicological, and of the bodies which furnish them ; secondly, the operations, chemical and unchemical, by which these materials are prepared and reduced to the state in which they are prescribed by the physician.

It is, then, evident that chemistry, botany, Materia Medica, or the natural and pharmaceutical history of medicinal substances, and toxicology, must form the foundation of his studies.

He must also be acquainted with certain laws of physics, and should be quite familiar with all operations relating to the preparation of medicines and the dispensing of medical prescriptions. This latter part of his education can only be acquired by practice in his business, and the law requires from every candidate some years of this practical experience. But the scientific knowledge which we have just enumerated cannot be obtained by the study of books only, nor by the daily practice of the operations of the shop.

The pupil can only acquire it by means of methodical instruction, by witnessing the chemical phenomena, the nature and theory of which are explained by the professor ; by seeing and manipulating substances, the character of which should be impressed on his memory ; by performing himself the experiments which throw light on the principal properties of bodies, the knowledge of which is indispensable.

Our schools of Pharmacy fulfil all these conditions. Six courses of lectures are given annually, having for their object chemistry, botany, toxicology, pharmacy, the natural history of medicines, and physics.

Lastly, the pupils acquire practical science in the botanical garden of medicinal plants, and in the laboratories in which chemical and pharmaceutical manipulations are performed.

The utility of all these studies admits of no doubt. But it may be asked whether the existence of a special school of pharmacy is necessary to initiate the pupils in the different branches of science the aid of which is indispensable. There exist, in the vicinity of these schools, other establishments where botany, chemistry, physics, and Materia Medica are taught with care ; and, at first sight, it might be supposed that the education of the pharmaceutical pupil might be conducted as well by means of the School of Medicine or of the Faculty of Sciences, as by means of a special School of Pharmacy. Is there not in this arrangement a double employment of the same means, causing needless expense to the state, and capable of reform without injury to the interests of science and of society ?

To solve this question, it is well to recollect that scientific studies are destined sometimes to exercise our intelligence in logic, observation, and method, to develop our ideas on the nature of things, to elevate the mind, sometimes to impress on the memory facts which ought to be known, and to familiarise us with the principles and processes of investigation useful in the career which we propose to follow. In the latter case, the notions acquired are, so to speak, the utensils, the knowledge of which is kept in view in the particular operations executed, and, as the material agents employed in our factories must vary in their properties according to the use for which they are designed, so these utensils of the mind cannot be identical when the services to which they are to be applied are altogether different. It follows, therefore, that instruction in any science, to be efficacious, must not be given in the same manner, when it constitutes an important portion of a high philosophical education, as it is when all its influence is directed to a special object—that the course to be pursued must not be the same when the ends in view are different—and that studies to which the same name is applied are, in reality, different when pursued in reference to the applications of science to the operations of Pharmacy, to the explanation of phenomena of life, to the treatment of the sick, to the working of mines, or to any other branch of industry.

The courses of Chemistry, for example, if well arranged, would not be alike at Sorbonne, at the Faculty of Medicine, at the School of Pharmacy, and at the department of Arts and Trades.

At the Faculty of Sciences the professor will endeavour to give his numerous and heterogeneous class knowledge at once general and positive: he will enter deeply into the study of the numerous phenomena, show all the grandeur of their results, and explain the laws and theories by the aid of which the facts are interwoven, and chemistry constituted a branch of the subject.

In a school of Medicine, the same instruction assumes a different character. The professor addresses students already familiar with the elements of Chemistry, and should concentrate their attention on the study of physiological and morbid phenomena, the action of therapeutic agents, and the art of making this influence subservient to the treatment of disease. It is not, therefore, general Chemistry, but Medical Chemistry, which he should teach; that is to say, the science should be applied essentially to that which relates to the tissues and fluids of the human body, the phenomena in the animal economy, and the nature of the bodies which may be made applicable to nutrition or medical treatment. He should not dwell upon these considerations to the exclusion of the general principles of the science. which are necessary to complete the chain of instruction; but he should only enlarge upon those questions which relate to the special object in view, and these he should treat in a manner much more complete than is necessary elsewhere.

The course of Chemistry destined for Pharmaciens is not subject to the same conditions, and has other requirements. Here, physiology and the general philosophy of the science, may be superficially treated ; but the mind must be familiarised with the various re-actions by means of which the combinations of bodies are determined, or their elements separated : the properties of the substances the Pharmacien is called upon to manipulate, and those details a knowledge of which is useful in conducting pharmaceutical operations. Mineral and organic analysis should be insisted on, and the attention should be particularly directed to many special considerations not necessary for the Medical Student, or those who with different objects in view study the science in its general character.

In England the terms *Pharmacien* and *Chemist* have become synonymous. Chemistry, which is in medicine an accessory science, forms the basis of the most important labours of the shop : the Pharmacien is the ordinary Chemist of society, and if he is not always at the top of his profession, it is because his chemical studies have not been pursued to a sufficient extent. Far from believing it possible to supply this branch of instruction efficiently, by the general courses of the Faculty of Sciences, or the courses of Medical Chemistry of the Faculty of Medicine, we would give to the lectures of the profession of Pharmaceutical Chemistry a still more special character and a greater importance.

The law of Sept. 27, 1840, has rendered compulsory in all Schools of Pharmacy the existence of laboratories in which the students practise Chemical manipulations. We cannot too much applaud this happy innovation, for in Chemistry as in all other things, practice is an essential element of education, but this part of the instruction does not yet appear to us to have arrived at the state of development which is desirable. To give to our young Pharmaciens the chemical knowledge which the interests of society require of them, these practical exercises should be greatly multiplied and their character elevated.

At the present time it is only in fact the most eminent Pharmaciens who possess the skill required to analyse a mineral water—to recognize the nature of a therapeutic agent—to separate the proximate principles of an alimentary substance, or to assist justice in questions of legal medicine; and, nevertheless, in the majority of such cases, the Pharmacien ought to be the counsellor whose experience should be at once called into requisition.

Formerly, a multitude of substances were daily prepared in the shop or laboratory, and the apprentice became familiar with various chemical processes; but for some years it has been the custom for the Pharmacien to purchase the materials for dispensing medical prescriptions, and that which passes under the eyes of the apprentice is prepared at a distance in some chemical manufactory. The apprenticeship has, therefore, lost much of its practical utility, and it is only by means of the Schools of Pharmacy that young men can acquire methodically that chemical instruction which they so much require.

What we have just said respecting the courses of chemical lectures, applies equally to the subject of Botany. At the School of Pharmacy a special kind of instruction is required, which to the general student or the medical practitioner would be inapplicable or unnecessary.

The Botanical Gardens annexed to the Schools of Pharmacy and Medicine, afford an advantage to the student which he could not derive from collections of preserved plants, however complete or extensive.

The utility of a course of lectures on toxicology, addressed especially to Pharmaciens, appears to us to be equally manifest. The Physician, it is true, should not be unacquainted with this branch of science, and it is taught in the Medical Schools, but the Pharmacien, being called upon continually to operate on substances which are medicines or poisons, according to the mode of administration, should make this an object of longer and more profound study. The interest of society demands it.

The public welfare also demands that the Pharmacien should be able to take a part in delicate questions which often arise in cases of poisoning. By the direction of his professional education, and his daily labours, he is better prepared for this duty than the physician; but he could not afford the requisite aid to the ends of justice in such cases unless sufficiently exercised in toxicology, and in the examination of the matters with which poisons are often mixed—operations which are regularly performed at the laboratories of the Schools of Pharmacy. This part of the education cannot be furnished by books alone, neither can it be acquired in the shop. It is necessary to have recourse to the practical school.

It appears superfluous to dwell here on the necessity for courses of pharmacy, properly so called, Materia Medica, and the natural history of drugs, including questions relating to the preparation of medicines and the detection of adulterations. The physician need only possess general information on these subjects, while for the Pharmacien every thing is important, even the most minute details.

To complete this review we need only allude to the course on physics. This science is less intimately connected with the special labours of the Pharmacien, and it is because he is not obliged to study the complex theories of acoustics, of light, electricity, and magnetism, that it is useful to give him that information which he requires apart from the details, which would embarrass by leading him astray.

To recapitulate—we consider that the speciality of the courses of instruction, provided for the pharmaceutical student, is an essential condition of success. These students will find neither in the Faculty of Science nor in the Faculty of Medicine, lessons appropriate to their wants, and it would be impossible to modify the courses in these schools to meet the special exigency, without injuring the fundamental character which it is important to preserve. This is only one of the numerous applications of the true and general principle of the division of labour; a principle which appears to regulate the creations of nature as well as the productions of industry. A utensil or an organ with two functions or ends, is never so perfect as a special instrument, in the structure of which all has been combined with a view to a single object. To impose on a course of instruction the obligation to serve two different purposes, would injure its influence on the studies for which it was instituted.

We have hitherto considered the Schools of Pharmacy only in relation to their effects on the Students, but there is another point of view in which they should be examined in order to appreciate all their advantages. We must also consider the influence which they exert on the progress of science.

Is it right that the State should come forward in aid of men, who, probably to the detriment of their commercial interests, bestow their energy and their intelligence on the study of questions from which Society must, sooner or later, derive honour and benefit? Ought the Government, the guardian and protector of the common weal, to remain indifferent to these labours, and to do nothing to ensure their continuance? Again, have those men who have directed the pharmaceutical studies in France, been absorbed entirely in the cares of their profession, and have they not rendered to science services worthy of recompense?

The names of Baumé, Rouelle, Parmentier, Bayen, Vauquelin, Scrulas, Pelletier, and Robiquet, not to mention those who still live, give a sufficient answer to these questions, and prove that it is a benefit to the country to encourage, by preserving the Chairs of Pharmacy, the scientific men who tread in the path of research so usefully followed by their predecessors.

The amalgamation of the Schools of Pharmacy and Medicine would be attended with another inconvenience; it would tend, in the first place, to diminish the studies strictly pharmaceutical; and, on the other hand, to create in France a class of demi-doctors, whose medical capacity would be inferior to that of the officers of health, whose existence is already considered by many to be injurious to the interests of society. In fact, a Pharmacien having studied in a School of Medicine, would often be tempted to consider himself competent to follow the art of curing, and would easily pass himself off as such in the eyes of a large proportion of the population, although his studies had not been directed to this end, and he had given no proof of medical capacity.

The Commission has, therefore, been unanimously of opinion, *that the Schools of Pharmacy ought not to disappear from among the educational bodies, and that their union with the Faculties of Medicine or the Faculties of Sciences would be attended with serious inconvenience.*

This being admitted on principle, it remains for us to consider the financial question, and to examine whether the number of these professional Schools exceeds the real necessities of pharmaceutical instruction.

There are at present about 6000 Pharmaciens established, but all those who obtain a certificate of qualification do not immediately embark in business, and some continue a certain time in the capacity of Assistants; others are attached to the hospitals or the army, and are not included in the above return. Consequently, the number of Pharmaciens with diplomas amounts to not less than 7000 or 8000.

It is in general at the age of twenty-five that candidates are admitted, and it is ascertained by calculation from the tables of mortality, that the probable duration of life is then about forty years. It must also be noted that many of them retire from business on the approach of old age, and that others change their occupation while still young. The average period during which they are in business, may therefore be reduced to about thirty years. Taking into account the normal reinforcement of the pharmaceutical body according to the above returns, we may calculate about 250 receptions annually, or more, if the increasing prosperity of the country should permit the opening of pharmaceutical establishments in places where none had previously existed, the functions being performed by officers of health. Practically, in the 36,819 districts ("communes") into which France is divided, there are only about 300 where this branch of medical science is performed by a Pharmacien. In more than 32,000, the sick are obliged to send for medicine to a neighbouring town, or to apply to an officer of health.

The public schools for the professional education of Pharmaciens are three in number, one in Paris, one at Montpellier, and the other at Strasbourg. Since they formed part of the University, that is, since 1841, they have incurred an average annual expense of 175,000 francs; but this expense does not fall on the State purse, it only figures as a memorandum in the general expenses of the country, and it is supported entirely by the individuals who without compulsion, come to the Schools of Pharmacy for instruction and a certificate of qualification. In fact, since the union of these Schools with the University, the receipts on examinations and diplomas have risen on the average to 180,000 francs annually.

During the last eight years the treasury has, therefore, benefitted by the Schools of Pharmacy. The sum total of receipts has been 1,448,537 francs. The expenses 1,407,212 francs. These establishments, far from being burthensome on the finances, have left in the public purse a surplus of 30,000 francs. At the present time it is true, the Schools cost the State more than they produce to the treasury; but even viewing the question financially this would be no sound argument for their suppression, for they are still subsisting on the profit of times past, and it will be easy to show that the falling off in their receipts, which is the all engrossing subject at this moment, arises from accidental and temporary circumstances.

In fact, the considerable diminution in the number of Students during six years, is a natural consequence of the artificial prosperity which the Schools enjoyed during the early period of their annexation to the university. They admitted in 1841, 1842, 1843, and 1844 a great proportion of the Students who, in the ordinary course of events, would have presented themselves during the subsequent years, and it is easy to comprehend what must be the result.

The enactment of 1840 provides that every candidate for the title of Pharmacien must possess a diploma of Bachelor of Letters, but this clause did not become obligatory until the end of 1844; consequently, all the Students who dreaded the new requirement (and this was the majority) have taken advantage of the transitory state of affairs and received what was conceded to them before the expiration of the period.

Thus the number of receptions, which in 1841 was only ninety, rose to 225 in 1842; in 1844 the Schools of Pharmacy granted 303 diplomas, and in 1845 only 169. A corresponding deficiency was necessarily felt in the succeeding years, and in order to form a correct idea of the population of the schools, we must select neither the years of interested activity above alluded to, nor the subsequent period of reaction. We must take the average of the last eight years.

Moreover the state of difficulty lately manifest in our Schools of Pharmacy, results in part from another circumstance. Contrary to the provisions of the enactment of 1840, a great number of Students, taking advantage of an exemption sanctioned by the great master of the university, have been admitted to examination without having obtained the diploma of Bachelor of Letters, and this favour has been obtained exclusively by candidates, who instead of profiting by the methodical education of the Schools, have remained in a shop, and applied to the local boards for their certificate of qualification. This indulgence, in direct opposition to the thirteenth article of the enactment of 1840, and the spirit of the organic law of the eleventh year, has, without doubt, tended to cause the desertion of the Schools, and to encourage the Students to adopt a course which we consider fatal. It is desirable that the admission of Pharmaciens by the local boards should be the rare exception rather than the rule; for it is only in the Schools that the Students can obtain the requisite scientific instruction. But, last year, out of 155 diplomas which have been granted, 110 were granted by the local boards, and only forty-five by the Schools.

Far from favouring this tendency, the interests of science and of society demand that fresh obstacles should be raised to counteract it. Of 150 candidates who in 1845 presented themselves before the Medical Boards, only ten fulfilled the conditions required by our rules, and 140 had obtained the exemption which is never allowed to students who attend the Schools.

The above considerations relate to the Schools in general, but to complete our task we must examine each of these establishments individually.

The most important of these is that of Paris, the preservation of which is a duty to science and to society: its destruction would be a disregard of the interest of the public, and of a debt contracted by the State to its founders.

It was not the public purse of the nation which founded this School, the date of which is 1576. The College of Pharmacy owes its origin to an individual Pharmacien of Paris, Nicolas Houel; and it was by the support of the Corporation of Apothecaries of the same city that this establishment acquired the enlargement necessary for its efficiency. The College of Pharmacy of Paris, survived unscathed the social storms of the end of the last century, and slightly modified in its constitution by the law of the 11th year, took at this period the name of *Special School of Pharmacy*, by which name it is still known. From 1803 to 1841, the school subsisted and grew on its own resources; its fixtures were bequeathed to it by the corporation which it represented, the State furnished neither land, nor buildings, nor other accommodation. Its receipts enabled it to remunerate its professors, to reconstruct its buildings, to form great and useful collections, and to open laboratories for the practical instruction of students. In short, when by the operation of the enactment of 1840 it ceased to administer its own affairs and became attached to the University, it brought to this educational body a capital of about 500,000 francs. Since this period it has received from the public purse 855,706 francs, and has yielded 1,088,388 francs, thanks to its good management and the importance of the part it had to perform. It has therefore been at the same time an establishment of public utility and a source of profit to the treasury: it has realised 232,682 francs more than it has cost. But we must not rest upon this secondary part of the question. France, thank God! is not yet reduced to the necessity of calculating sordidly the cost of that which is useful for her glory and prosperity; and we are glad to state that the School of Pharmacy of Paris is an establishment which may be confidently quoted as being, in many respects, a model for imitation. Perfection is not consistent with our nature, and we do not deny that improvement might be introduced in some parts of the institution, but the results already obtained are good, and leave nothing to be desired but the complete development of the system of practical instruction. To disorganize the School, as proposed by some small economists, or with the idea of creating something better, would be, in our opinion, acting like a gardener who tears up from the earth a great tree loaded with fruit, for the purpose of improving its position or to save himself the trouble of watering its roots.

It may probably be urged that this School, like the others, has lost its importance : that in 1844 the pupils came in crowds, and 210 diplomas were granted ; while in 1846 and 7 the number diminished by two-thirds ; that in 1848 it was reduced to 71, and last year to 47. But we have already shown the transitory circumstances which swelled the numbers unnaturally from 1841 to 1845, and which could not otherwise than result in a corresponding diminution.

At present it is true this cause of disturbance ought not to be very sensibly felt ; but other circumstances of a temporary nature have tended to estrange the students from the School. It is during the last two years that the ranks have been observed to decline, and this is not surprising, nor should it be attributed to any defect in the instruction, for during these two years the heads of families have had no inducement to send their sons to Paris, and moreover we may ask—has prosperity existed any where during that time ?

But already the aspect of affairs has improved, and we may anticipate that unless fresh political troubles should occur, the School of Pharmacy in Paris will resume its normal state. This is not a vain anticipation; it is founded on positive and incontrovertible facts. At the commencement of last year only sixty-seven students were registered in the School. This year ninety-one have presented themselves. From the 1st of January to the 20th of April this year there were eighty-six examinations. In 1849 during the corresponding period there were only sixty-seven.

It is, then, evident that activity is beginning to revive in this branch of study, and if the students be not diverted from the School by the facilities which are afforded them by the Local Boards, it is probable that their number will soon be sufficient to defray the existing incumbrance on the establishment. In fact, eighty receptions annually would effect this object, a number which was obtained on the average from 1830 to 1840.

The Schools of Montpellier and Strasbourg are far from being in so favourable a position.

The *School of Montpellier* is second in rank. Like that in Paris it was for a long time independent. Until 1841 it managed its own affairs, and its receipts were not only sufficient to defray expenses, but also to rebuild a great portion of the premises, to found a botanical garden, a museum, and other accessories. From 1830 to 1840 the average number of students received was thirty annually.

From 1841 to 1845, after its union with the University, and having in perspective the literary requirements above-mentioned, the number of diplomas granted rose to fifty, then to seventy-six, and even reached seventy-nine; but since the degree of bachelor of letters has been compulsory, the number of candidates has rapidly diminished. In 1846 this School conferred the title of Pharmacien on only sixteen candidates; in 1847 eight; in 1848 the number was reduced to five; and last year it was eight.

The *School of Pharmacy of Strasbourg* is of recent origin. As a teaching body it takes date from 1835; and, up to the present time, it has been but little encouraged, so that even under the circumstances above-mentioned, which stimulated the other schools, it has never, except in one year (1841), paid its expenses. When the diploma of bachelor was about to become indispensable—that is from 1842 to 1844 inclusive—it received, on the average, fifteen Pharmaciens annually ; but in 1845 and 1846 the number was reduced to five, for the two succeeding years it fell to three or four, and in 1849 only one candidate received his diploma, and two students passed the preliminary examination.

To what cause can we attribute this decline in the Schools of Montpellier and Strasbourg ? We have every reason to believe that they have been conducted with zeal and efficiency; we must seek the cause among external circumstances.

Therapeutics have lately been much simplified, and probably the profession of Pharmacien has become less lucrative. This will not serve to account for the change, as it is only since 1845 that the Schools have suffered. Apart from the perturbation occasioned by the state of transition on the subject of the degree of bachelor, no very marked change has been observable in the number of students who have embarked in Pharmacy; and the desertion of the Schools appears chiefly to arise from the number of young men who apply for their diplomas to the Local Boards instead of presenting themselves to the superior tribunals at Montpellier and Strasbourg.

At the period when the return furnished by the students was sufficient to cover the expenses of the three Schools, that is, until 1845, a certain ratio subsisted between the number of candidates who selected the one or the other of the two modes of obtaining a licence, and this ratio was determined by the appreciation of the advantages or the inconveniences respectively belonging to each.

The candidate who remained at home and passed his entire apprenticeship in a shop, and who applied to the Local Board for his certificate of qualification, was, in general, but little and badly educated, but attained his object at scarcely any expense. Those who left their homes to complete their studies at Paris expended much more money, but received a professional education far superior, and on their return to the locality where they wished to establish themselves they enjoyed a much higher character. At Montpellier the students, natives of the south of France, enjoyed the same advantages to a minor degree, for Montpellier has long enjoyed great medical celebrity. Lastly, the natives of the west obtained at Strasbourg a solid education; but in the estimation of the public found themselves not much more appreciated than those who obtained their licences from the Local Boards; for the Faculty of Medicine at Strasbourg did not enjoy the same popular reputation as that at Paris or at Montpellier. The mode of distribution of the students between Paris, Montpellier, Strasbourg, and the Medical Boards of the departments, depended on the comparative advantages before-mentioned; but for some years the equilibrium has been disturbed, different circumstances have diminished the inconvenience of local education and increased the difficulties of qualification at the superior Schools, consequently the latter have lost more pupils, and the superiority of their diplomas is less esteemed by the public. Thus Montpellier has suffered more than Paris, and Strasbourg more than Montpellier.

[The report proceeds to give other statistics, showing that of 100 receptions in Paris during three years, fifty-five were at the superior School, and forty-five at the Medical Boards; in the south, the number who resorted to the superior school at Montpellier during the same period was only twelve per cent., and at Strasbourg only eight per cent. Among the causes of this decline, especially in the latter locality, is mentioned the increase in the number of secondary schools of medicine and faculties of sciences, which encourage some students to avail themselves of the general and superficial instruction thus afforded, instead of frequenting the superior schools. This circumstance, while in one sense it is mentioned as an evil, is in another respect considered beneficial, as a means of affording a limited amount of instruction to some persons who would otherwise have been in absolute ignorance.]

The report continues:

It is then proved that society derives an advantage from the instruction of Pharmaciens in the scientific branches of their art, as well as in its practice, and we think we have demonstrated that the students in Pharmacy ought to have methodical instruction in all the subjects combined in the special requirements of their profession.

While admitting the insufficiency of the part performed by the Schools of Montpellier and Strasbourg, we think it not advisable to suppress them, or to weaken them by reducing the instruction in Chemistry, Botany, or even in Physics, and depending on the Faculties of Medicine and of Sciences for these branches of education. We think it desirable on the contrary, to strengthen the action of these special Schools, and to make their utility more manifest, and that this might be attained by the further development of practical studies, and by enforcing strictly the law respecting the conditions of admission of candidates at these Schools, and of those at the Medical Boards, and by establishing a marked distinction between Pharmaciens who have completed their education at a superior School, and those who have had no methodical special instruction, and have only learnt their art by routine.

We were not instructed to inquire whether the Local Boards perform their functions efficiently, whether the professor of the Faculty of Medicine presiding over these Boards (consisting of two Physicians and four Pharmaciens of the department) is not often obliged to protest by his black ball against the incompetence of candidates admitted by the majority, and whether the interests of Pharmacological studies does not require a modification of existing arrangements, but we consider these questions have so important a bearing on the future welfare of the Pharmaceutical body, that we have thought it right to draw attention to them.

In conclusion—The Commission is of opinion,

1st. That the superior Schools of Pharmacy are institutions of great utility, and that it would be contrary to the interests of society and of science to destroy them, or to unite them either to the Schools of Medicine or the Faculties of Sciences.

2d. That the character of the Courses of Lectures having for their object the same sciences, ought not to be identical in the Schools of Pharmacy, in the Faculties of Medicine, and in the Faculties of Sciences, and that, consequently, the professional instruction of the Schools of Pharmacy would suffer by the suppression of any one of the Chairs at present provided, even that of Physics.

3d. That the state of decline manifested for some time past in the Schools of Pharmacy, depends chiefly on exceptional and temporary circumstances created by the change in the regulations introduced in 1845, but anticipated since 1840, and on the facilities of admission afforded to candidates by the Local Boards.

4th. That to prevent the further estrangement of Students in Pharmacy from these Schools, it is necessary especially to enforce in a regular manner the provisions of the 13th article of the law of 1840, &c.

5th. That to establish a distinction between those who have regularly studied in the superior Schools, and those who have resorted merely to an apprenticeship, or any other course, it is desirable that they should not be called by the same name, and that the licence of Pharmacien should only be conferred on those who have passed the examination at a Special School.

6. That to increase the utility, already considerable, of the superior Schools of Pharmacy, it is desirable to develope more fully the chemical and toxicological manipulations, as well as other practical studies.

It could only be financial considerations that led to the idea of diminishing the number of the Schools of Pharmacy by the suppression of one of them, that of Strasbourg for example, or by the union of a portion of their Chairs with those of the Faculties of Science or of Medicine. These combinations would only be practicable at Strasbourg, or possibly also at Montpellier, where the local arrangements would occasion no very serious obstacles. But the economy thus resulting would be very small. In fact, it would be no more than the remuneration of a professor or two, for it would be necessary to increase the accommodation of the Faculty charged with this new duty, and the expenses of the practical School would remain unaltered.

Now this result would only be obtained by disorganizing establishments which, for a long time, have enjoyed an undoubted prosperity, and which might continue to render useful service to the country.

The closure of the Schools of Strasbourg and Montpellier might, probably, cause a greater influx of students to Paris; but this excessive centralization would, in our opinion, be attended with more than one disadvantage. Every wise and enlightened Government ought to protect strictly the interests of the contributors; but when public instruction is the question at issue, we think the balance of profit and loss cannot be computed as in a commercial operation. France contains a smaller number of inhabitants than Russia ; she is less rich than England ; but she enjoys the first rank among modern nations in her glory in the sciences as well as her grandeur in military exploits, and she owes much of this intellectual pre-eminence to the protection the State has always given to institutions of public instruction, as well as to the men whose labours contribute to the development of the human mind. The question before us almost disappears in the midst of interests so great and so elevated, but it is not foreign to tendencies which would be fatal to these noble traditions, and which would lead us to appreciate every thing in a mercenary point of view. (Signed)

Thenard, Orfila, Berard, Bussy,
J. Persoz, E. Chevreul, De Jussieu,
Milne Edwards. *Secretary.*

THE DISPENSING OF MEDICINES BY UNEDUCATED PERSONS.

(*The following case has been communicated by a Correspondent in the North-West of England, we omit the names*).

Mr. H. succeeded, about a month since, to the business of a Mr. E. Mr. H. had been apprenticed to a surgeon, was just out of his time, and had never been in the drug trade: he is a very young man, and exhibits in each window, " Medical advice gratis, by C. H. H." On Friday night he told the shopboy to fill the carbonate of soda jar, and while doing so, he observed the article did not look like carbonate of soda, and thought it was cream of tartar; told the boy not to fill it up, and it was put back on the shelf. Mr. H. fills a situation of dispenser at the workhouse, and went to his duties there on the Saturday morning, not returning till four in the afternoon, and leaving his mother, who is unacquainted with the business, in charge of the shop. During his absence, half-an-ounce of carbonate of soda was required, which his mother weighed from the jar partly filled with the doubtful contents. On his return he said " I hope you have sold no carbonate of soda, as I think it's cream of tartar." He was told a halfpennyworth had been sold. About seven o'clock in the evening Mrs. M., who had bought the soda, came to tell him that she had mixed it with 12¼ lbs. of flour, and made bread, and also of the same dough a cake, which she baked at home, and of which she and her husband, and five children, had partaken, and all had within an hour been seized with vomiting, purging, pains in the stomach, and faintness: she stated her belief that the soda was wrong ; he assured her it was all right, the flour or barm must have been adulterated, that it was of no consequence, and would soon pass off. On the Sunday she came again, complaining of the same symptoms and reiterating her charge, which he still denied, and said it was not worth while taking anything, but if she wished he would give her something to stop the sickness, and gave her two opium pills, and some powders, for which he charged. *Now he began to suspect the sodæ carb. might be arsenic*, but took no further steps, and changed the powder in the jar for carbonate of soda. Mrs. M. then went to a neighbouring Druggist, who asked for the loaf, and he took a portion of it at once to an operative Chemist, who soon pronounced it to contain a large quantity of arsenic, and procured medical assistance for the suffering family.

On making further inquiry it was found that the old bag marked "*sod. carb.*" contained an inner bag marked *arsenic alb.*, and that in the valuation of stock it had been charged as *arsenic;* yet when *he suspected arsenic* from the symptoms, he never took the trouble to examine the parcel or the stockbook, and had not others interfered, it is more than probable that one or more of the sufferers would have died from the effects.

The woman was six months gone with child, and premature labour has been repeatedly threatened. The eldest girl suffers so severely from palpitation of the heart, and other inflammatory nervous symptoms as to threaten a protracted illness at least. The rest continue to feel the effects more or less severely.

THE MEDICAL PROTECTION SOCIETY.

This Society, which was established for the purpose of collecting debts and persecuting Druggists, has paid the debt of nature. The successful resistance of the first attempt of the Society to establish a precedent against Chemists and Druggists, was reported in our number for May, 1849 (Apothecaries' Company *v.* Wells). This terminated the crusade. The subsequent proceedings of the Society have been chiefly confined to the collection of the debts of its members, and the establishment of a bank to take care of the money. Considerable irregularity in the pecuniary affairs having been discovered, an investigation was demanded. On the 21st of September, a meeting took place, at which it transpired that £1800, which had been taken care of by the Secretary, was not forthcoming. A committee was proposed, but no funds being in hand to defray the expenses of an investigation, the meeting dissolved. Subsequently, a few of the members have formed themselves into a committee for the purpose of endeavouring to resuscitate the Society. Another society of a similar kind has lately been formed. If both should survive, the *trade in physic* will be doubly protected in the profession.

ANONYMOUS CIRCULAR.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Sir,—I have received an anonymous circular, said to be from a Committee of a body of Memorialists, commenting upon the position and prospects of the Pharmaceutical Society, and concluding by asking a reply to five questions. As I am desirous to give my opinion through the medium of the Journal, will you do me the favour of inserting it in your next number.

I am, Sir, your obedient servant,

174, *Shoreditch*, *Sept.* 11, 1850. John Beaton.

In answer to your five queries, with reference to the Pharmaceutical Society, I beg leave to say, I do not consider it expedient that the questions proposed should be discussed at the present time. The great object to be desired is an Act of Parliament, to render absolute the will of the large body of Chemists who are anxious to raise the character and standard of their business. The Editor, the President, and the other gentlemen who from time to time constituted the Council, have, in my humble opinion, done immense service to the cause of pharmaceutical advancement. I believe those now in authority are taking every available means of bringing our claims before Parliament, and to interrupt this object for any secondary consideration seems to me neither politic nor just.

NOTICES OF BOOKS.

THE PHARMACOPŒIA OF THE KING AND QUEEN'S COLLEGE OF PHYSICIANS IN IRELAND, 1850. Hodges and Smith, Dublin.

THE new Dublin Pharmacopœia has at length appeared, and when it is considered that twenty-four years have elapsed since the publication of its predecessor, it will not be thought that the Irish College of Physicians have indicated, at least in this respect, an undue love of change. Three years have been occupied in preparing this work, during which time experimental and other inquiries of various kinds have been steadily carried on under the direction of the College, "having for their object to correct whatever might be defective in the processes previously given, and to introduce such new medicinal agents as would seem called for by the rapid progress made in modern times, by those sciences from which our knowledge of therapeutics is chiefly derived."

The first circumstance that attracts notice on opening the book, is that, with the exception of the names of the articles enumerated under the head of Materia Medica and those of the preparations, the whole work is written in English. In this respect, the Irish College has followed the example of its Scotch neighbour. This, however, is not the only innovation that has been made. Having entered upon the work of renovation, the College seems to have carried out its object in a thorough spirit of reform. The arrangement of the subjects is new, as well as the language in which they are expressed, and even the weights and measures which have hitherto been used in preparing and dispensing medicines, have been changed for the new imperial weights and measures such as are used in commerce. This change will probably excite some surprise, especially when it is considered that the ounce will no longer consist of 480 grains, but of 437.5 grains; the drachm will no longer contain 60 grains, but 54.68 grains; and the scruple, instead of representing 20 grains, will for the future be equivalent to 18.22 grains. We hope that both prescribers and dispensers will be able to recollect the new values of these weights, sets of which, it is stated in the preface to the work, Mr. Donovan of Dublin "has undertaken to supply at a moderate cost, and without the slightest view to personal profit."

A considerable number of new preparations, or of new formulæ for old preparations, are introduced, and many of the preparations of the previous Pharmacopœia are omitted. Among the former are glacial acetic acid, gallic acid, for which there are two formulæ, tannic acid, heavy carbonate of magnesia, carbonate of zinc, ammonio-citrate of iron, solution of hydriodate of arsenic and mercury, iodide of sulphur, oxide of silver, several essences and new syrups, chloroform, and valerianates of iron, quina, and zinc.

On the present occasion, it is our object merely to state concisely the general nature of the changes which have been introduced into the work without expressing any opinion. In our next number, we intend to offer a few remarks on the subject.

CHOLERA AND ITS CURES, *An Historical Sketch.* By J. STEPHENSON BUSHNAN, M.D., &c., &c. 8vo, pp. 169. London: W. S. ORR and Co., Amen Corner.

TO CORRESPONDENTS.

M. P. S. A. (Hull).—The nature of a compound sold by Mr. Peche under the name of Tannate of Alumina, was exposed, vol. ix., page 406. It is an impure common alum, in no respect resembling tannate of alumina.

G. (Clifton).—We are not aware that napthaline is used medicinally.

W. T. (Kingstown)—We cannot suggest a better mode of extracting quina from the disulphate than the usual one with ammonia. Care should be taken to precipitate from a concentrated solution, and to avoid adding excess of ammonia.

H. Y. D. (Liskeard).—Amalgams for teeth, see vol. ix., page 402.

Y. (Worcester)—Castor oil is usually bleached in this country by exposure to light. Sometimes it is filtered through animal charcoal.

D.—(1.) The sample of "precipitated chalk" consists of sulphate of lime.—(2.) SOLUTION OF COPAIBA, commonly called Franks's Specific:

Balsam of copaiba, two parts
Liquor potassæ (vel sodæ), three parts
Distilled water, seven parts
Boil for a quarter of an hour, then add
Sweet spirit of nitre, one part
Separate the clear liquid by means of a funnel or glass separator.

(3.) The preparation alluded to in the third question, is liable to stamp duty, because the disease is mentioned; otherwise it might pass as a cosmetic.

An Old Country Member will find the subject explained in another part of this number.

P. M.P.S. (Cirencester.)—(1.) We cannot recommend the substitution.—(2.) We have no data on the subject.—(3.) We shall notice the subject in a future number.

I. Q. (Brighton).—See Fownes's *Manual of Chemistry*, or any other elementary work on Chemistry. For further information recourse should be had to the lecture-room.

J. B. R.—The threat of legal proceedings is ridiculous, as explained in another part of this number.

H. Q. Should inquire of the Secretary, giving his name and address.

A Young Farmer.—Gypsum or sulphate of lime is commonly used for fixing ammonia in the manufacture of manures. It was originally recommended for this purpose by Liebig.

U. A. F.—It is cupri. ammon. sulph.

M. P. S. (Reading.)—Essence of lemon is soluble in all proportions in absolute alcohol, but not in rectified spirit.

E. T.—There is a much more complete table than that referred to, in the last edition of Gray's *Supplement*.

I. S. T. (York.)—We do not think the specimen of tea sent is adulterated. The portions thought to be a composition, when soaked in water and examined with a microscope, are found to consist of broken pieces of leaf, which have probably stuck together while damp.

An Apprentice (Basingstoke).—It is not necessary.

E. W.—(Chichester).—When "Liq. quinoid" is ordered in a prescription, the prescriber should be asked what he means.

An Associate (Stourbridge).—A young man seeking a situation as dispenser in New York, would have a much better chance of success after having passed an examination.

A Subscriber.—We have no space to spare for Homœopathy this month.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Other Communications to the EDITOR (to the care of Mr. CHURCHILL).

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. VII.—NOVEMBER 1st, 1850.

PHARMACY IN GREAT BRITAIN.

THE PRESENT STATE AND PROSPECTS OF THE PHARMACEUTICAL SOCIETY.

In our last number we expressed a favourable opinion of the state and prospects of the Pharmaceutical Society, and gave notice that we should offer a few remarks on the subject this month. We now proceed to substantiate our opinion by a simple statement of facts.

First, with regard to the **Pharmaceutical Meetings**. These Meetings have been kept up, with occasional intermission, from their origin in 1841 to the present time. On the average, we have no hesitation in asserting that the attendance has been as good as that of the Meetings of any other Society with which a comparison can fairly be drawn. On no occasion has there been a deficiency of materials for discussion, and, in numerous instances, a portion of the *agenda* has been omitted or deferred for want of time to complete the whole. During the first year or two the average number who attended may be stated at from 100 to 150. As the stimulus of novelty subsided a diminution was observable, especially towards the close of the season, or when no subject of special interest had been announced for discussion. On two or three occasions the number did not exceed fifteen or twenty. Such fluctuations occur in all Societies. At the last Pharmaceutical Meeting (reported page 217) the room was crowded—the number was estimated at upwards of 160—being, we believe, the largest Meeting of the kind since the establishment of the Society. The papers and other *agenda*, were equally abundant, enough having been deferred to occupy another Meeting.

Next, as to the **School of Pharmacy**. The attendance in the practical class in the laboratory has been steadily improving. The number of students from the years 1844—45 to 1849—50, were respectively as follows:—10, 27, 27, 27, 31. Within a fortnight of the opening of the present session every place in the laboratory was engaged, and several other candidates are expected, who will be obliged to wait until vacancies occur, unless temporary accommodation be made in the other parts of the house. The class in the lecture-room, although not so large as that during the first session of the school, exceeds in number the classes of some of the intermediate sessions. This branch of the establishment is not likely to meet with the encouragement to which it is, from its importance, entitled, until education is enforced by legislative means. It is, however, a mistake to suppose that because the School is not at present remunerative, *therefore* the Students are recipients of charity. As well might it be said that all the customers of a man commencing business are paupers, because during the first year or two his returns have fallen short of his expenses. The School, with the present terms and arrangements, would more than pay its expenses if the benches were well filled; but this, it appears, can only be done by the *vis a tergo*, in the shape of an Act of Parliament, overcoming the *vis inertiæ* of the Associates or their employers. Considering that Pharmaceutical education i voluntary, and comparatively a novel idea in this country, there are no grounds for discouragement. Many of the students have distinguished themselves in a very creditable manner, and the School is raising up a class of Chemists who will perform an important part in advancing British Pharmacy.

One circumstance, however, we must here notice which is contrary to our expectation. Some Students having attended the lectures and the practical class, and having passed their examinations, have not thought it incumbent upon them to continue their share of support to the Society from which they have derived these advantages.

This leads to another branch of the subject—THE LIST OF MEMBERS.

During the first year or two after the Society was formed, a certain latitude was given in the admission of Members, which does not now exist. In this position of affairs, and before the organization was complete, a considerable number of persons were admitted, who, under the regulations now in force, would have been deemed ineligible. Among these were not a few who merely paid one subscription for the purpose of obtaining the certificate of membership, without any intention of continuing their support. The loss of these "mushroom Members" was a gain to the Society. Persons of this class, though they may swell the list of names, rather detract from the character of the Society than add weight to the scale.

The Members subsequently elected passed through a more severe ordeal, and in moral influence have more than supplied the deficiency in numbers. Those who were admitted without examination, by virtue of the exception in favour of Chemists in business before the date of the Charter, have all produced certificates as evidence of their eligibility. Others have been admitted by the regular examination, which is another step in advance.

We subjoin a report of the admissions and examinations.

First, The admissions before the examinations began:

	MEMBERS.	ASSOCIATES.	REGISTERED APPRENTICES.
Original List, 1842	984	976	—
Amended List, 1843............	1625	2011	34

Secondly, Supplementary lists after the commencement of the examinations. The first period comprises the interval from the date of the Charter,

	NEW MEMBERS.*	MAJOR EXAMINAT.	MINOR EXAMINAT.	CLASSICAL EXAMINAT.
February 23, 1843, To December 31, 1845	540	8	42	218
The Year 1846..................	120	12	11	74
The Year 1847..................	105	12	13	82
The Year 1848..................	40	19	24	58
The Year 1849..................	77	19	22	84

The present number of Members is 1470.

Reverting to the Report of the Pharmaceutical Institutions in France, quoted in our last number, we find an anolagous fluctuation in the admissions at the Schools of Pharmacy, attributeable chiefly to a similar cause, namely, the anticipation of increased stringency in the examination, which was announced some time previously, and came into operation at the end of 1844.

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* It should be stated that the List of Members comprises all who were elected, whether by certificate or examination; also a considerable number who were previously Associates. Some of those who passed the major examination are not yet Members.

	PARIS.	MONTPELLIER.	STRASBURG.	TOTAL
1844 the admissions were	210	77	15	302
1848	71	5	3	79
1849	47	8	1	56

In drawing this comparison it must be borne in mind that the population of France exceeds that of England in the ratio of 35½ millions to 15 millions; and that the Pharmaciens in France are supported by the right hand of the Government, while the Chemists in England have only the "cold shoulder."

It is also worthy of remark that our list of Associates has greatly fallen off in consequence of many of the Associates having become Members, and that both lists have been considerably diminished by death, retirement from business, misfortune, and other casualties.

We also find that many of those who are at present excluded from the list have not absolutely retired from the Society, but are merely in arrear in their subscriptions, and eligible to be reinstated. What proportion of these will resume their membership is not at present known, but the fact will be ascertained in January, 1851, when the complete List of Members announced by the Council will be published.

THE BRITISH PHARMACOPŒIAS.

In Turkey there is no Pharmacopœia, consequently the same medicine obtained at different shops is entirely different in its medicinal properties. —*Pharmacy in Turkey, by Landerer.*

In Great Britain there are three Pharmacopœias. The London Pharmacopœia takes date from 1618; the fourteenth official edition is now in the press. Of the Edinburgh Pharmacopœia, the first edition appeared in 1699; the fifteenth in 1841. The Dublin Pharmacopœia was of later origin.

Every new edition of each of these Pharmacopœias, brings us nearer to the predicament existing in Turkey. Not content with contradicting each other, the several Colleges contradict themselves, the dictum of one edition being at variance with that of another. The same term has three different meanings—the same preparation three different degrees of strength—in England, Scotland, and Ireland respectively, and, in some cases, in each country at different periods.

Therefore, whether we view the British Pharmacopœias topographically, chronologically, or statistically, serious ambiguities present themselves. Every ambiguity in a prescription is a trap for the Chemist. It may be compared to a sign-post pointing between two roads, one of which terminates in a ditch. Some medical men adopt the new system, others adhere to the old. Prescriptions are written in each of the three sections of the United Kingdom. These prescriptions travel from one to the other, and they are preserved by patients for a series of years. Time and space alike alter the size of the bottle, the strength of the dose, or the nature of the pill. It is the same prescription, but, as in Turkey, so in Great Britain, the medicine is different.

The authors of Pharmacopœias have no sympathies with the dispenser. They never stood behind a counter with an ambiguous prescription in hand, asking themselves these questions:—"Was it written in England, Scotland, or Ireland? Was it written before a certain date or after? Was the author of it one of the old school or the new?" On the answer to these questions may depend 100 per cent. in the strength, 25 per cent. in the measure, or 10 per cent. in the weight. The nature and composition of the preparation may be entirely different in each case, yet the prescription was written with a specific object, adapted to a particular constitution, and the dispenser is bound by law to prepare it faithfully.

For example—infusion of digitalis, according to the three Colleges, is prepared according to three different formulæ, one of which is twice as strong as the others. Solutions of the salts of morphia in Edinburgh and Dublin are not of the same strength. Tincture of ginger is more than three times as strong in Ireland as in England. Other tinctures also vary, some being weaker, others stronger. Compound colocynth pill is one thing in Scotland another in Ireland. Compound rhubarb pill in Scotland and in England are different preparations. The diluted mineral acids are not of uniform strengths in the three Pharmacopœias. The alkaline carbonates in England vary according to the date of the prescription. So also does the strength of nitric acid, acetic acid, hydrocyanic acid, &c. &c. The inconvenience arising from the change in the pint measure is proverbial, and the Dublin College has now mystified the drachms and the scruples, which require four figures of decimals for reduction from English to Irish. Many other instances might be given.

If the interference of the legislature be requisite in sugar refining for the protection of the public health, the same salutary jurisdiction is far more necessary to check the recklessness of the three Colleges.

We have not proceeded with the review of the Dublin Pharmacopœia, as that work is coming forward for discussion at the next Pharmaceutical Meeting.

THE EXHIBITION OF THE WORKS OF INDUSTRY OF ALL NATIONS.

An aggregate meeting of the Local Commissioners for the Metropolitan districts, was held at the Old Palace, Westminster, on the 23d of October, for the purpose of considering the completeness of the demands for space applied for by intending exhibitors.

It was reported, that nearly all the space at disposal had been applied for; but the demands in some departments being in excess, while others were overlooked, or only partially represented, a revision of the list had been made for the purpose of supplying deficiences.

The description of the articles to be exhibited, was, in many instances, too vague to enable the Commissioners to make a complete classification, and it would be necessary for the exhibitors shortly to furnish more precise details respecting the objects they propose to send.

In the meantime, a number of articles were mentioned which had not been included in the returns, and the Local Commissioners present were requested to direct their attention to those branches of industry hitherto not represented, with a view of completing the list before the end of the month.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING.

The first of the Evening Meetings for the season was held on Wednesday, the 9th of October, and was very numerously attended by Members and Associates of the Society and their friends.

Mr. Ince, President, having taken the chair, congratulated the Members on the evidence of continued interest and zeal in the welfare of the Society, which the numerous attendance afforded. He trusted that a similar feeling would be manifested at the subsequent Meetings, and that the ensuing season would prove to be, as the commencement of it appeared to promise, with regard to these Meetings, one of the best since the establishment of the Society.

DONATIONS TO THE LIBRARY AND MUSEUM.

The following donations were announced as having been made to the Library and Museum—

From the **Council of the Royal College of Surgeons.**—Vol. i. of the Descriptive and Illustrated Catalogue of the Histological Series contained in the Museum of the Royal College of Surgeons.

From Mr. **Alsop.**—Specimen of true Venice Treacle, purchased at Venice; specimen of Ceratonia Siliqua and fruit; specimen of Quercus Suber, with male and female flowers.

From Mr. W. **Penney.**—African Arrowroot; Cotton cultivated near Sierra Leone.

DISTRIBUTION OF PRIZES.

The **Chairman** stated, that he had the gratifying duty to perform of presenting the **Prizes** which were awarded to students in the classes of **Materia Medica**, **Chemistry** and **Pharmacy**, and **Botany**, during the last session.

The Prizes consisted of handsomely bound volumes of Pereira's Materia Medica, Brand's Chemistry, Daniel's Introduction to Chemical Philosophy, Ure's Dictionary of Arts and Manufactures, Lindley's Vegetable Kingdom, and several other books of this class.

The Questions for examination, and the successful competitors, were as follows :—

MATERIA MEDICA.

EXAMINER, DR. PEREIRA.

Questions.

1. What are the proper botanical names of the plants sold in the shops under the name of *Carrageen Moss?*—and by what characters are the species distinguished from each other? What are the chemical, dietetical, and medicinal qualities of carrageen moss ?
2. Name the plants used in the manufacture of orchil and litmus ; give a sketch of the process for making, and describe the chemical properties of these pigments.
3. Describe the physical and chemical properties of yeast, and explain its supposed agency in the process of vinous fermentation.
4. You are required to give an outline of the opinions which have prevailed respecting the nature of Ergot; and to draw a parallel between

the laboratory pupils than among those who merely attended the lectures, which was generally the case in consequence of the superior advantages for study which the laboratory pupils possessed, yet it was due to the lecture pupil (Mr. Copney), who had gained a prize, to say that the value of his answers were higher than those of either of the other competitors. He stated this without disparagement to any of the competitors, who had all distinguished themselves very creditably, but with the view of showing how much may be done, with application and industry, even by those who are engaged in business throughout the day, especially when aided by a word of encouragement, or a little indulgence occasionally from their employers.

Lecture Pupil.

Prize...Mr. William Copney, Plough Court, Lombard Street.

Laboratory Pupils.

First Prize.............. Mr. Charles Goode.
Second Prize............. Mr. Albert Cayley.
Certificates of Merit...1. Mr. William Archer.
" " 2. Mr. W. G. Johnson.
" " 3. Mr. John Marshall.

GENERAL AND MEDICAL BOTANY.

EXAMINER, MR. BENTLEY.

Viva voce Examination.

The following plants were submitted to the candidates, who were required to name them; to state the natural order to which each belonged; to mention the medical and economical properties of each; and to describe any peculiar feature in any of the plants:

Papaver somniferum, Chelidonium majus, Delphinium Staphysagria, Linum usitatissimum, Althæa officinalis, Æthusa Cynapium, Conium maculatum, Agrimonia Eupatoria, Bryonia dioica, Momordica Elaterium, Anchusa tinctoria, Symphytum officinale, Borago officinalis, Marrubium vulgare, Mentha viridis, Mentha piperita, Mentha Pulegium, Mentha sylvestris, Lactuca virosa, Cichorium Intybus, Cichorium Endivia, Anthemis nobilis, Pyrethrum Parthenium, Inula Helenium, Solanum Dulcamara, Solanum nigrum, Lobelia inflata, Rubia tinctoria, Ricinus communis. Aristolochia Clematitis.

Written Examination.

Questions.

1. Describe the different forms of Woody Tissue in plants, and state the Tribes and Organs in which they are respectively found.
2. Explain the structure of the General Integument and its Stomata.
3. What are the characteristic distinctions between the stems of Acotyledonous, Monocotyledonous, and Dicotyledonous plants?
4. Describe the process of Respiration in Vegetables, and compare the changes which it produces upon the Atmosphere with that of the Respiration of Animals.
5. Describe the manner in which seeds germinate; mention the conditions favourable to the process; and state the differences between the germination of Monocotyledonous and Dicotyledonous plants.
6. Enumerate and explain the modes of Placentation; and mention the views of Schleiden with regard to their origin.
7. What are the distinctive characters between the following fruits:—

Drupe, Legume, Samara, Cremocarp, Capsule, Siliqua, Cone, and Galbulus ?

8. Describe the structure of the Ovule, and explain the meaning of the terms—Orthotropous, Anatropous, and Campylotropous Ovules.
9. Explain the following terms: Chalaza, Funiculus, Hilum, Raphe, and Micropyle.
10. To what Natural Orders, Classes, and Sub-Classes of De Candolle's Natural System would you refer plants possessing the following characters ? (*a*), Calyx 5-lobed, persistent ; Petals 5; Stamens numerous, perigynous ; Ovaries superior ; Styles distinct; Fruit a follicle ; Seeds suspended; Embryo straight; Albumen none; Leaves pinnate alternate. (*b*) Flowers hermaphrodite ; Calyx 2-leaved, deciduous; Petals 4 ; Stamens numerous, hypogynous ; Ovary 1-celled, with parietal placentæ ; Fruit a capsule; Seeds numerous ; Albumen abundant.
11. Give the essential characters of the following Natural Orders:—Ranunculaceæ, Malvaceæ, Rosaceæ, Cucurbitaceæ, Scrophulariaceæ, Gentianaceæ, Euphorbiaceæ, and Orchidaceæ.
12. Distinguish the Lobeliaceæ from the Campanulaceæ ; also the Solonaceæ from the Ericaceæ, Scrophulariaceæ, Gentianaceæ, and Primulaceæ.

The values of the answers furnished by the several competitors, were indicated by numbers set against their names or mottoes, in both the oral and written examinations. In relation to the successful competitors the numbers stood as follows:

Oral. Written. Total.
Mr. John Marshall...... 150 + 560 = 710—FIRST PRIZE.
Mr. Albert Caley ...... 115 + 580 = 695—SECOND PRIZE.
Mr. Charles Goode...... 125 + 560 = 685—CERTIFICATE OF MERIT.

ACTION OF CHEMICAL AGENTS ON SULPHITE OF LEAD.

Mr. REDWOOD communicated the result of some experiments he had made, with the view of ascertaining how far sulphite of lead is acted upon and rendered soluble, by certain agents which it might be expected to encounter if introduced daily into the stomach with the food. The inquiry had reference to a question which had recently excited some degree of public interest in connexion with a proposed improvement in the manufacture of sugar. A patent had been taken out for this process, which consisted in precipitating impurities from saccharine solutions with subacetate of lead, and subsequently removing any excess of lead by passing sulphurous acid gas through the solution. The lead was thus converted into sulphite, which is so insoluble that it had been found practicable to remove every trace of lead by this means. Many persons, conversant with the manufacture of sugar, were, nevertheless, doubtful as to the safety of allowing so deleterious a substance as lead to be used in the preparation of an article of daily food, alleging that from carelessness, or imperfections in the apparatus, or even in the process itself, the public health might be endangered. The results of the investigation instituted by the Government to determine what amount of danger was to be apprehended from the adoption of the patented process, had been published in the last number of the Pharmaceutical Journal. The Chemists employed by the Government had found lead, in minute quantities, in the sugar, and, in larger quantities, in the treacle; and the medical men who had been consulted had expressed opinions to the effect that danger was to be apprehended from the daily consumption of an article of food containing these quantities of lead. Opinions had, however, been expressed on the other side of the question. Dr. Gregory had made some inconclusive experiments by administering sulphite of lead to animals, and had come to the conclusion, in which Mr. Brande concurred, that it was *perfectly innocuous, and as harmless as so much chalk*. "This," he says, "might be predicted from its excessive insolubility and very stable nature, arising from the powerful affinity of sulphurous acid for oxide of lead—this prevents the formation of carbonate (white lead) which is truly the poisonous lead compound." It was this statement, and others to the same purport, which had suggested the experiments about to be described. Sulphite of lead had been represented as innocuous in consequence of its great insolubility and very stable nature; it appeared desirable, therefore, to determine, not only whether it be stable and insoluble when treated with distilled water, which is of very little consequence with reference to the question practically at issue, but whether it be equally unaffected when submitted to the chemical agents to which it would be subjected when introduced into the stomach.

1. *Action of Water and Acetic Acid on Sulphite of Lead.*—Sulphite of lead was prepared by passing sulphurous acid gas through solution of acetate of lead. The whole of the lead was found to be thus precipitated, and none could be detected in the liquor, even after standing in contact with the precipitate for several days.

2. *Action of Hydrochloric Acid on Sulphite of Lead.*—Water acidulated with hydrochloric acid speedily decomposes sulphite of lead, and the liquor, after standing for some time, affords a white precipitate of carbonate of lead on the addition of carbonate of soda, and an abundant black precipitate with sulphuret of ammonium.

3. *Action of Chloride of Ammonium and Chloride of Sodium on Sulphite of Lead.*—On macerating sulphite of lead in solution of chloride of ammonium, the liquor was found to be largely impregnated with lead, affording precipitates with carbonate of soda and with sulphuret of ammonium. The action of chloride of sodium on the sulphite was much less marked than that of the preceding salt, the tests affording only a slight indication of the presence of lead in the liquor.

4. *Action of Lactic Acid on Sulphite of Lead.*—The liquor resulting from the maceration of sulphite of lead in a weak solution of lactic acid, afforded evidence of the presence of lead in small quantity, the amount being rather greater than that taken into solution by the action of chloride of sodium.

5. The sulphite of lead being acted upon so quickly, and the lead rendered soluble by hydrochloric acid, it was concluded that free hydrochloric acid added to a weak solution of a soluble salt of lead, would prevent the precipitation of the lead by sulphurous acid, and this was found to be the case. A solution, prepared as above, in which sulphurous acid gave no precipitate, afforded precipitates with carbonate of soda and with sulphuret of ammonium.

6. *Action of Carbonate of Soda on Sulphite of Lead.*—With the

view of determining whether the affinity between sulphurous acid and oxide of lead be so powerful as to prevent the formation of carbonate of lead, as stated by Dr. Gregory, ten grains of sulphite of lead were added to a solution of twenty grains of carbonate of soda in four ounces of distilled water. After standing for two or three days, without the application of heat, the insoluble salt was collected on a filter, and treated with dilute acetic acid. The liquor thus obtained gave copious precipitates with carbonate of soda and with sulphuret of ammonium, thus proving that the sulphite had been partly converted into carbonate by the action of a weak cold solution of carbonate of soda.

Dr. Ure stated, as the result of much experience and communication with several of the most extensive sugar refiners, that the process proposed for purifying sugar with lead could not be safely applied on the manufacturing scale, especially since it had been shown, by the experiments which had just been described, that sulphite of lead is not the stable and insoluble compound it had been represented to be. He was satisfied that the workmen, both here and in the plantations, ought not to be entrusted with so dangerous an agent as that used in this process.

The Chairman alluded to the minuteness of the quantity of lead found in the specimens of sugar which had been examined, and expressed a doubt if lead was so virulent a poison as some persons seemed to consider it.

Dr. Golding Bird thought it very erroneous to suppose that because a substance is insoluble it is necessarily innocuous. Calomel and carbonate of lead might be adduced as instances, amongst many others, of insoluble yet energetic compounds, which prove the fallacy of such an opinion. He did not consider the salts of lead to be powerfully poisonous, and in this respect agreed with the Chairman. Acetate of lead was frequently administered by the physician, in doses of a grain or a grain and a half, frequently repeated; but in such cases it was given guardedly to effect a particular object. Its effects were closely watched from day to day; and, should any unfavourable symptoms ensue, its further administration would be instantly stopped; but the case was widely different when lead was administered unconsciously in small doses, mixed with the food, and repeated daily for a great length of time. Introduced into the stomach in this way, the circumstances were most favourable for promoting absorption, and as it was known to accumulate in the system, especially in the liver, its deleterious effects were frequently not experienced until the means of removing the poison were beyond our power. Even the most stable and insoluble compounds were sometimes incapable of resisting the action to which they are exposed, when introduced into the stomach under the influence of that mystic thing, life. The temperature of the body, and the contact of substances in a state of molecular change, tended greatly to promote the decomposition of such compounds. Thus sulphate of soda, which might be kept in solution in pure water without undergoing any change, is speedily decomposed, if a bit of sea-weed be introduced; the influence of molecular changes in the vegetable matter being sufficient to overcome the powerful affinities existing in the salt. If such be the case with the most stable compounds, how much more so with those which are readily susceptible of decomposition under ordinary circumstances, as Mr. Redwood had proved to be the case with sulphite of lead. He considered the experiments not only interesting but important, and he had no doubt of their correctness, as he knew that his colleague, Dr. Alfred Taylor, had obtained very similar results. Ingenious and scientific as he must admit the patented process for the purification of sugar to be, he thought, nevertheless, that it ought not, at least for the present, to be sanctioned by those to whose opinion the public looked to with confidence and respect, and upon whose decision in such cases the lives of many of our fellow-creatures may depend.

PROVINCIAL TRANSACTIONS.

MINUTES OF THE THIRD ANNUAL MEETING OF THE BIRMINGHAM PHARMACEUTICAL INSTITUTION,

Held at the Philosophical Institution, Cannon Street, October 18, 1850.

MR. W. SOUTHALL, PRESIDENT, IN THE CHAIR.

The President opened the Meeting with a short address, in which he commented on the objects of the Institution, and on the great change which has of late years taken place in reference to the qualification a Chemist and Druggist is expected to possess. He likewise offered some useful advice to young men as to the mode of pursuing their studies, pointing out to them how much more might be accomplished by persevering in a regular methodical course of study, than by excessive application at irregular intervals. He particularly recommended students not to over-fatigue themselves at the commencement, not to expect to accomplish too much, as the disappointment that must necessarily follow, would give them a dislike to study, and induce negligence.

The President then called upon one of the Secretaries to read the Report of the Committee.

The Report gave a general account of the most important transactions of the past year, under the following heads:—

1st. The Library had been rendered more accessible than formerly, and had been increased by the addition of several valuable standard works. The Committee acknowledged the donation of a complete copy of the Pharmaceutical Journal from the Editor. A Reading Room had been opened in connexion with the Library, which was supplied with several periodical publications on Pharmacy and the allied sciences. The circulation of books had increased.

2d. Six meetings were held during the winter season. The Committee felt less satisfaction in reporting upon this than upon any other department of the Institution. The number of contributors of papers had been too small to keep up sufficient interest, and the Members generally appeared rather apathetic. There was, however, some slight improvement over previous years, though the Committee were far from being satisfied with the progress that had been made. The subjects of the papers had not always been announced previously to the meetings, but whenever this had been done, a larger attendance was obtained.

3d. Five lectures were delivered on the following subjects:—

Pharmaceutical Chemistry	Mr. C. F. Palmer.
The Officinal Starches	Mr. W. Southall, Jun.
Chemical Symbols and Formulæ	Mr. J. Horncastle.
Materia Medica (the Animal portion)	Mr. Lyons.
Materia Medica (the Vegetable portion)	Professor Knowles.

It has been the custom to have Lectures delivered alternately with the Meetings, but this practice has been found inconvenient, and it has therefore been resolved to leave it to the Committee of Management to decide, according to circumstances upon the business of each meeting during the ensuing season.

Professor Knowles has engaged to deliver a course of Twenty Lectures on Materia Medica, to which Members of the Institution and others will be admitted by payment of a small fee.

4th. Finance :

Dr. BIRMINGHAM PHARMACEUTICAL INSTITUTION. *Cr.*

To	£	s.	d.	By	£	s.	d.
Balance in hand Sept. 30, 1849,				Rent and Hire of Rooms......	8	10	6
General Fund.... 1 16 2¼				Printing and Stationery	3	6	6¼
Lecture Fund.... 1 11 6				Library Expenses	6	12	4
	3	7	8¼	Sundry ditto....................	0	15	4
Members' Subscriptions	20	1	0	Balance in hand—			
Subscriptions to Lecture Fund	8	15	0	Lecture Fund.... 10 6 6			
Sundry Receipts	0	8	2	General Fund.... 3 0 8			
					13	7	2
	£32	11	10¼		£32	11	10¼

We, the undersigned Auditors, have examined the Accounts of the Birmingham Pharmaceutical Institution, and find the above statement to be correct.

Signed, **Edward Snape,**
Thomas Humphreys.

The Report concluded by referring to the Liverpool, Bristol, and several other Societies of Chemists and Druggists.

Mr. **Snape** proposed, "That the Report be received and entered in the minutes of this Meeting, and that an abridgement be prepared by the Committee and printed."

The motion was seconded by Mr. **Bird**, and carried unanimously.

Proposed by Mr. **Chas. F. Palmer**, seconded by Mr. **Cattell**,

"That the following gentlemen having been duly nominated, be elected Members of the Committee and Auditors of Accounts for the ensuing year, in place of those who retire by rotation :—

Members of the Committee: Mr. Snape, Mr. John Sumner, Mr. Humphreys, Mr. Wilcox, Mr. Bird, Mr. Leay. *Auditors of Accounts:* Mr. Foster, Mr J. J. Martyn."

They were unanimously elected.

The following were among the contributions of drugs and chemicals which were on the table :—

From Messrs. J. & E. Sturge.—Amorphous or Allotropic phosphorus, crystals of tartaric and citric acid, chlorate of potash, &c.

Mr. J. Shorthouse.—Very fine specimens of crystals of sulphate of copper.

Mr. Wiggin.—A series of specimens illustrative of the manufacture of copper, magnificent specimens of pure metallic nickel and cobalt.

Professor Shaw.—A large button of pure nickel.

Mr. C. F. Palmer.—Arsenic in various states, obtained from the stomach of a person who had been poisoned.

Messrs. Southall.—Seven specimens of scammony of various qualities. A collection of genuine and spurious specimens of Peruvian bark.

RESULTS OF AN EXAMINATION OF SEVEN SPECIMENS OF SCAMMONY.

BY MR. THOMAS SOUTHALL.

No.	Quantity of Resinous Extract per cent.	CHARACTER OF OTHER CONSTITUENTS.	Cost, or price offered at per lb.	Cost of Resin per lb.		Relative value, taking No. 1 as the standard.	
			s.	s.	d.	s.	d.
1	85	Water about 5 per cent., solid matter, composed of carbonate of lime, gum, and vegetable matter insoluble in water or spirit	40	47	0	40	0
2	75	Similar to those of No. 1, only in greater proportions, particularly the insoluble vegetable matter..	26	34	8	35	3
3	66	Chiefly carbonate of lime. The specimen examined was from the external part—the internal light-coloured part would contain water to the amount of probably 10 per cent., which would, of course, enhance the cost of the resin a little	19	28	10	31	0
4	49	Chiefly starch, with some carbonate of lime, &c.	15	30	8	23	0
5	39	Starch, with comparatively little of other substances	22	56	4	18	4
6	32	The same as No. 5.	13	40	8	15	0
7	7½	Not examined....	11	146	0	3	6

Mr. Albright exhibited a specimen of cohesive amorphous phosphorus, prepared in the laboratory of the Polytechnic School of Vienna, by Professor Schrötter, and remarked, that the presence of Dr. Percy at their meeting this evening reminded him that it was while Dr. P. was sitting as President of the Chemical Section of the British Association, rather more than a year since, that the article to which the specimen now on the table was so nearly similar, had been first introduced to British Chemists. He regretted that his firm (that of John and Edmd. Sturge) had not yet found the time and opportunity to avail themselves practically of the purchase they had made of Professor Schrötter's discovery. It would be recollected that what was then exhibited was amorphous phosphorus, in powder, which differed from the cohesive simply in the mode of preparation, and in being from that difference the purer article of the two. The difficulty of detaching the amorphous phosphorus from the glass vessel in which it had been subjected to distillation to drive off the crystallized or ordinary phosphorus, in mixture with which it was produced, had led to the use of sulphuret of carbon to dissolve out the latter, in which menstruum the amorphous form of phosphorus was wholly insoluble, and remained therefore behind in the form of a fine powder. The adhesive hard crusts in which the amorphous phosphorus occurred, when the distillatory process was resorted to, had suggested that into that *form* of the amorphous might the *whole* of any quantity of ordinary phosphorus be converted, which expectation had been realized, and its nearly perfect accomplishment was detailed in a paper contributed by Professor Schrötter to the proceedings of the Austrian Imperial Academy of Science in this present year. It remained, however, to be stated that the difficulty of so perfectly converting into amorphous phosphorus the whole quantity of the ordinary substance operated upon, so that no particle would remain unchanged, had yet to be overcome. The specimen exhibited might contain one or two per cent. still unchanged. In proof that the substance under notice could not be an oxide of phosphorus, it might be mentioned that it had been prepared in atmospheres of carbonic acid, of hydrogen, and of nitrogen—further, that if so operated on in a close vessel that a very minute proportion of the phosphorus employed should, by its combustion, consume all the contained oxygen, and give rise to the formation of phosphoric acid, the remaining larger portion would not the less be changed into the red allotropic form of phosphorus.

A more simple obvious proof, however, could not be afforded than the fact that a given weight of the ordinary, or as Professor Schrötter called it, the crystallized phosphorus, might be wholly converted, without change of weight, into the amorphous condition, and that again by a simple change of temperature, reconverted also, without loss or addition of weight, back again into its original condition and appearance.

A few words might be said of the properties of the article. It remains perfectly unchanged in the atmosphere, is insoluble in sulphuret of carbon, alcohol, ether, and naphtha. Oil of turpentine, and in general all liquids that only boil at high temperatures, will at that point take up some of it in solution. It requires a temperature of 260° Centigrade to effect the change from amorphous back to crystalline, and it is only when arrived at that point of the thermometer that it begins to inflame in the *open air*. It is not luminous in the dark at any ordinary temperature, in fact it only shows a faint light when heated nearly to the point of combustion. The practical advantages of the article were stated to be that it could be used with great advantage for the preparation of discharges for fowling pieces, and more importantly for the lucifer match. The liability in these to absorb moisture, and the injurious influence exerted at present on the workpeople employed in the lucifer match manufactory, and danger in the transport, would be removed by this discovery.

In reference to one very important point, Mr. Albright hoped that the Professor's statement might be found to be borne out in practice when he considered the comparatively intractable character of the new material, that it exhibited no luminosity if perfectly prepared, had no smell, and would not burn in the open atmosphere, or even in oxygen gas, at a temperature under 260° Centigrade (about 500° Fahr.)

The existence in this country of cases of that most fearful disease, which it was well known had been too frequent and too fatal on the Continent, in the workpeople employed in this kind of manufacture, had lately come to his knowledge—one (he believed, a fatal case) was that of a child, whose work being simply to put on the covers of the boxes when filled, did not require any direct contact of the article. The explanation of the injury in such a case had been made manifest to his view by the statement of a manufacturer, that the hand of a person so employed would in the dark be quite luminous with the condensed vapour of the phosphorus. Now he trusted it would be found that the amorphous phosphorus, which had been tried by a lucifer match manufacturer in Vienna with perfect success, would be found not so volatile, and giving rise to no such deplorable results. The Professor was anxious that his discovery, and the practical advantages of it, should be made manifest at the Exhibition in 1851—a point which he (Mr. Albright) hoped would be attained.

Dr. **Percy** said, it would be interesting to ascertain the physiological effects of allotropic phosphorus. It would be well worthy of the attention of philanthropists to discover if it were liable to produce the terrible disease that had been mentioned.

Mr. C. F. **Palmer** exhibited the peculiar reaction which takes place on cooling a concentrated hot solution of nitrate of mercury with excess of mercury. As the solution cools and crystallizes, numbers of little projections shoot up, sometimes to a considerable height, and branched, carrying on the summit a globule of metallic mercury. Mr. Palmer also exhibited the explosive properties of potassium and chloroform, or iodoform. He had discovered that either of the two latter substances, when placed in contact with potassium and struck or rubbed with some force, especially with a hot iron, detonated with great violence, leaving a deposit of carbon. He proposed the following as a probable explanation of the reaction that takes place :—

$$\begin{array}{ll} \text{1. Chloroform or iodoform} & \left\{\begin{array}{l} C_2 \text{ deposited} \\ H \text{ given off in a state of combustion.} \\ Cl_3 \text{ or } I_3 \searrow \end{array}\right. \\ \text{3. Potassium} & K_3 \longrightarrow \text{3 chloride or iodide of potassium.} \end{array}$$

Mr. Jacob Bell, with the permission of the President, made a few observations on the Institution, and on British Pharmacy generally. The Report which had just been read recalled to his recollection the circumstances of his first Pharmaceutical visit at Birmingham, between nine and ten years previously, and the contrast was quite encouraging. On the former occasion he with difficulty induced six or seven Chemists to attend a meeting, at which he explained the objects contemplated in the formation of the Pharmaceutical Society, and the importance of education as a leading feature in its proceedings. But little interest appeared to be excited in the undertaking, except as a means of protecting the commercial interests of the trade. A few members had taken a more enlarged view of the subject, and thus the nucleus was formed which had resulted in the growth of an institution likely to prove a valuable auxiliary to the Pharmaceutical Society. This could not, strictly speaking, be termed a branch of the Society, not being confined to the Members and Associates, but it had the same objects in view, and the Council had recognized the principle of sanctioning and encouraging any provincial associations of the kind, whether based on the exclusive principle of membership or otherwise. At the same time, it must always be borne in mind, that the existence of local Institutions did not at all diminish the necessity for supporting the Parent Society. Consistency of action throughout the country was highly important, and while each branch might be conducted in the manner best suited to the locality, the influence of all should be concentrated into one focus. Mr. Bell had visited several other provincial towns, and was glad to find, from observation and extensive correspondence, that a marked improvement had taken place during the last nine years, and that the advantage of scientific education to the Chemist was more generally appreciated than it had previously been.

He was glad to see the present meeting so well attended, and would venture to suggest that it would be advisable not to hold these meetings too frequently; but to regulate their number by the amount of existing facilities for keeping up the spirit of the meetings, endeavouring from time to time to provide some novelty either in the arrangements or in the subjects introduced, so as to secure a good attendance. Managers of theatres were obliged to be continually bringing out new attractions —medicines if long continued lost their effect, and must be changed—and all societies must keep pace with the times and bend to circumstances in regard to novelty. It was a good plan to leave discretionary power in the committee to vary the proceedings occasionally. The Pharmaceutical Meetings in London had fluctuated very much, the number present varying from 150 down to thirty, or even less. The last meeting (held in the previous week) was the largest since the formation of the Society.

Mr. Bell made a few remarks on the apathy of the Government in having failed to second the endeavours of the Chemists to protect the public by means of general pharmaceutical education, and drew a comparison between British and continental Pharmacy. In conclusion, he adverted to the Exhibition of 1851 as an event which would test the skill and energy of the respective manufacturers, explained the nature of the arrangements so far as they had been made for the chemical and pharmaceutical portion of the Exhibition, and expressed a hope that British Chemists would be found in the front rank.

Dr. Percy congratulated the Members on the progress the Pharmaceutical Institution was making. It would be superfluous to attempt to prove that a knowledge of Chemistry was an essential part of the education of a Chemist and Druggist. No person could be a competent judge of drugs without a good knowledge of that science. Adulterations were practised to such an enormous extent as to render an appeal to Chemistry constantly requisite. Many of the most eminent Chemists have been brought up to the business of Chemists and Druggists, among whom he might mention Scheele, Dumas, and Allen, as illustrious examples.

Professor Knowles said he trusted there would be sufficient zeal and perseverance to maintain the Pharmaceutical Institution.

Dr. Nelson considered that legislative enactments would be found ineffectual for the suppression of unqualified practitioners in Pharmacy; the Apothecaries' Act had been evaded, and if another act were passed for the protection of qualified Chemists and Druggists, it would be likely to share the same fate. The best way to distinguish between qualified and unqualified Chemists and Druggists, would be to instruct the public, that they might be able to judge whether they were supplied with good or bad medicines. The Exhibition of Industry would afford a good opportunity for this purpose, to lay before the public specimens of the various substances used in medicine.

Dr. Percy said, that he believed no stimulus would be required to induce Birmingham manufacturers to contribute to the Exhibition of Industry. He believed they had a thorough appreciation of its merits.

Votes of thanks were passed to the exhibitors of specimens at this Meeting, to the visitors, and to the President.

THE BRISTOL BRANCH OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.

MEETING OF THE CHEMISTS OF BRISTOL, SEPT. 27TH, 1850.

Resolved,—"That this Meeting feels the greatest interest in the progress of the science of Pharmacy; and in the hope that that progress is being hastened through the instrumentality of the Pharmaceutical Society of Great Britain, conceives it expedient that all who have this sentiment at heart should identify themselves as closely as possible with that body; and, therefore,

"That the Local Society, known as the 'Bristol Chemists' Association,' be dissolved, and that an Association be formed, consisting of Members of the Pharmaceutical Society of Great Britain, and called *The Bristol Branch of the Pharmaceutical Society of Great Britain*, of which Mr. Ferris to be President; Mr. Giles, Vice-President; and Mr. Martin, Hon. Secretary."

It was further resolved,—"That the proceeds of the sale of the effects of the late Bristol Chemists' Association be paid over to the Benevolent Fund of the Pharmaceutical Society.

"That a copy of these Resolutions be forwarded to Mr. Smith, the Secretary, and also to Mr. Jacob Bell, with a request that he will insert them in the Pharmaceutical Journal for November."

THE LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, October 18th, 1850.

THE PRESIDENT IN THE CHAIR.

Dr. Thomson delivered a very talented lecture on the "Diffusion of caloric in the Atmosphere." The varied effects of continent, ocean, or island, upon the wind over which it passes, were noticed, and the meteorological phenomena arising from the variations explained; the influence of latitude and of height in affecting the atmosphere were illustrated by a number of experiments made in various quarters of the globe, and in balloons, and a great number of interesting facts adduced. The valuable statistics introduced and the practical bearings of the subject are recorded in the very interesting "Introduction to Meteorology," penned by the the same able author.

Mr. J. B. **Edwards**, F. C. S., gave a review of the first six sections of the new Dublin Pharmacopœia. On the subject of the new series of weights introduced by the College, he considered the change would have been less inconvenient, as well as more consistent, had the College uniformly adopted the English instead of the Troy grain. Thus,

1 gr. English would equal 0.77 Troy grains.
24 grs. " ℈j.
36 grs. " ℈iss. = ʒss. = 1 adarm of silk, corrupted to the *dram* of later tables.
72 grs. " ʒj. English.
576 grs. " ʒviij. " ℥j.
See table in *Gray's Supplement*, page 15.

By the use of these denominations integer numbers would be retained, and the inconvenience would have been comparatively slight. The minim would weigh 1 gr. instead of 0.77, in accordance with their own argument.

The French system of decimal relations, founded on either the Troy or English grain, would undoubtedly be most convenient and unexceptionable for dispensing and pharmaceutical purposes, if any vital change were desirable.

The changes made in many of the formulæ are extremely important, and the strength of the preparations materially altered, and yet no such instance is once pointed out, and in no case is the real strength of the preparation given, or means recorded to ascertain it; the sp. gr. is generally given, but frequently this is no criterion whatever of the activity of the preparation, as in the case of acetic and hydrocyanic acids, &c. &c. In the latter acid the strength is increased from 1.6 to upwards of two per cent. of real acid, without any comment; liquor plumb. diac. dilut. is four times the strength; liquor arsenicalis is considerably stronger. Similar changes were pointed out in other preparations, and, in conclusion, Mr. Edwards strongly urged the union of the colleges and the adoption of one Pharmacopœia for the United Kingdom; such a provision, together with a compulsory examination of the dispenser, could, he considered, alone secure the public from error on the one hand and ignorance on the other.

Several Members gave their opinion that the decimal system of weights, and a united Pharmacopœia would be very desirable.

Mr. **Abraham** stated, that he made some dilute hydrocyanic acid according to the Dublin formula, and found it upwards of two per cent.; a second experiment, more carefully conducted, gave him a product containing 2.7 per cent., and he thought, with an iced refrigerator, a still stronger acid might be obtained by that process.

ON MYROSPERMUM PUBESCENS,

AND ITS MEDICINAL PRODUCTS BALSAMITO, BALSAM OF PERU, AND WHITE BALSAM.

BY JONATHAN PEREIRA, M.D., F.R.S.

There is no article of the Materia Medica whose natural history is more obscure than that of the so-called Balsam of Peru; for in all our best modern pharmacological and botanical works, errors, confusion, and doubts exist with respect to it.

Of the celebrated white balsam of America, I am not sure that European writers have any definite knowledge. It is mentioned, indeed, by most pharmacologists, but it is obvious from their statements that they are unacquainted with it; for some of them regard it as liquid amber, some as balsam of Tolu, and others as dry balsam of Peru; from all of which, as will be seen in the sequel, it essentially differs. It is, therefore, with much pleasure that I avail myself of the information and specimens kindly placed at my disposal by George Ure Skinner, Esq., now of Chipperfield House, King's Langley, Hertfordshire, but lately of Guatemala, to elucidate these subjects. To my friend Dr. Stenhouse I am also indebted for kindly undertaking the chemical examination of the white balsam, the result of which has been the discovery of a new organic principle, to which he has given the name of *Myroxocarpine.*

In order that my readers may fully comprehend the present state of our knowledge with respect to these drugs, and the sources of the errors and obscurities which have hitherto existed about them, I shall take a brief historical survey of the most important works and papers relating to them.

1. Nicolas Monardes, in whose work[*] (the first edition of which was published at Seville in 1565) the earliest mention of this balsam occurs, calls it simply *balsamo*, and says that it is the produce of a tree growing in New Spain, and called by the Indians *Xilo*. He describes the tree as being larger than a pomegranate tree, having leaves like those of nettles, and bearing a narrow, white, thin siliqua or pod, of the length of a finger, and thickness of a sixpence, and which encloses at the end one bitter, odorous seed, about the size of a pea. He mentions two modes of preparing the balsam: one by incision into the rind of the stem, the other by boiling the branches in water; and he afterwards notices its physical properties and valuable medicinal qualities.

Although Monardes was never in America, and must, therefore, have obtained his information from the reports of others, yet there is reason to believe his statements to be faithful.

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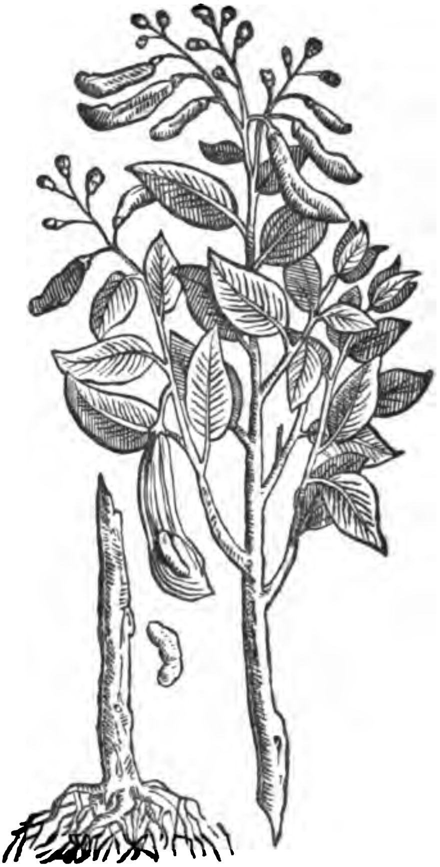
[*] *Dos libros, el uno que trata de todas las cosas que traen de nuestras Indias Occidentales, y el otro que trata de la piedra bezoar y de la yerba escorzonera.* Seville, 1565, 8vo (I have not seen this edition, which I quote on the authority of Don A. H. Morejon, author of the *Historia Bibliográfica de la Medicina Española*, tomo ii., p. 291, 1843. The editions which I possess are Clusius's Latin translation, *Exot.* lib. x., 1605; and Frampton's English version, entitled *Joyfull Newes out of the New-found Worlde*, 1596; and from these the extracts in the text are taken).

Fig. 1.



Hoitziloxitl.
(Copied from Hernandez).

2. The next writer who describes the balsam and the tree yielding it, is Francisco Hernandez,† a Spanish physician and naturalist, who resided for seven years (viz., from 1593 to 1600, A.D.) in Mexico and New Spain. He notices four balsam trees, one called *Hoitziloxitl*, a second termed *Huaconex*, a third denominated *Maripenda*, and the fourth found in the province of Tolu. Of these four, the first one appears to me to be identical with the tree which yields the so-called balsam of Peru, and I, therefore, subjoin a copy of Hernandez's figure of it (fig. 1).

Hernandez states that the Indian balsam tree (*Arbor Balsami Indici*) is called by the Mexicans *Hoitziloxitl*, because it abounds in resin. He describes it as being of the size of lemon tree, and having leaves which are larger than those of the almond, but rounder, and more acuminate. The flowers are yellow, and are placed on the summits of the branches. The seeds are whitish, oblong, somewhat contorted, and lodged at the extremity of the oblong shells or fruits, which are longer and broader than the leaves. The tree, he says, is a native of warm regions, as Panuco, and was cultivated by the Mexican kings in the Hoaxtepec gardens. He describes two methods of obtaining the balsam, and states that the seeds yield by pressure an oil which resembles in flavour and odour that obtained from bitter almonds and peach kernels.

3. After the death of Linnæus (who had always been peculiarly anxious to ascertain the plant which yields this balsam), Mutis sent to

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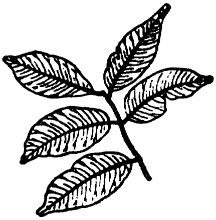
† *Plant. Animal. Mineral. Mexicanorum Historia.* Ex Fr. Hernandez, a N. A. Recchio. Romæ. 1651. fol.

the younger Linnæus specimens of the leaves and flowers of a plant, which he said grew in the warmest provinces of South America, and yielded Peruvian balsam. A description of this plant, to which the name of *Myroxylon peruiferum* was given, was published in the *Supplementum Plantarum*, p. 233, 1781. Subjoined is a figure (fig. 2) of the incomplete leaf of Mutis's specimen, contained in the collection of the Linnæan Society, and of which a detailed description has been published by Sir J. E. Smith, in Rees's *Cyclopædia*, vol. xxiv, article *Myroxylon peruiferum*[‡].

FIG. 2.

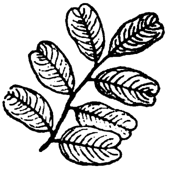


Leaflets of *Myroxylon peruiferum*. Linn. (From Mutis's specimen in the Collection of the Linnean Society. The woodcut is about one-third the natural size of the leaf).

Considerable difference of opinion has existed among botanists as to the identity of this species. Lamarck[§] regarded it as identical with Jacquin's[‖] *Myrospermum frutescens* (fig. 3), and distinct from his own *M. pedicellatum* (fig. 4); Sir J. E. Smith considered it to be different from both of these species; while Kunth[¶], whose view has been adopted by De Candolle[**], declared it to be distinct from *M. frutescens*, but identical with Lamarck's *M. pedicellatum*.

No doubt now exists that it is entirely distinct from *M. frutescens*; but its identity with *M. pedicellatum* is at first view less satisfactory; for in Mutis's specimen in the Linnæan collection, the leaflets are acuminated, whereas in Lamarck's figure they are represented as being obtuse, though in his description he says they are sometimes a little pointed. The question, however, is usually considered to have been set at rest by Kunth, who examined and described another specimen of this species, given by Mutis to Bonpland; and declared it to be distinct from *M. pubescens*, but identical with the plant described and figured by Lamarck as *M. pedicellatum*; and De Candolle, in his *Prodromus*, has adopted the opinion of Kunth.

FIG. 3.



Leaflets of *Myrospermum frutescens*. Jaq. (From Kunth's figure. The wood-cut is about one-third the size of the original figure).

On the authority af Mutis many writers declare the *M. peruiferum* of Linnæus to be the source of balsam of Peru. But if Mutis's plant be a different species from that described and figured by Ruiz (*Myrospermum pubescens*, De Cand.), as Kunth declares that it is, it follows that the common opinion is erroneous; for my specimens indubitably prove that the Balsam of Peru of commerce is got from the species described and figured by Ruiz. I do not mean to assert that Mutis's plant may not yield a balsamic substance—perhaps it does so††—but it is not the source of the liquid known in European commerce and used in medicine under the name of Balsam of Peru.

[‡] Mutis's specimen in the Linnæan Society consists of the imperfect leaf above figured, and of a flowering branch. Attached to the same sheet of paper is a long pod, which has been erroneously described by Sir J. E. Smith, as the fruit of *M. peruiferum*. In the *Suppl. Plant.*, no mention is made of fruit sent by Mutis; and the pod which has been, by some remarkable mistake, glued to the paper, is certainly not the fruit of a *Myrospermum* or *Myroxylon*.

[§] *Encyclop. Méthodique Botanique*, t. iv., p. 191, 1795-6.

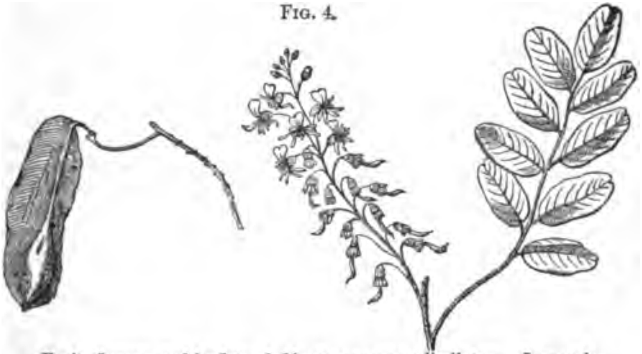
[‖] *Select. Stirp. American. Hist.*, p. 152, 1788.

[¶] Humboldt, Bonpland, and Kunth, *Nova Genera et Spec. Plant.*, t. vi., p. 294 fol. 1823.

[**] *Prodromus*, part ii., p. 95, 1825.

4. The plant which Lamarck described and figured under the name of *Myrospermum pedicellatum* (fig. 4) was collected by Joseph de Jussieu, in Peru, where it is said to be called *quina-quina*. As I have before stated, this species has been found by Kunth to be identical with the *Myroxylon peruiferum* of Linnæus. No mention is made by Lamarck of any resin or balsam being obtained from it.

FIG. 4.



Fruit, flowers, and leaflets of *Myrospermum pedicellatum*. Lamarck.
(From Lamarck's figure in the *Encyclop. Méthodique*. The woodcut is about one third the size of Lamarck's figure.)

5. The first accurate botanical description of the tree which yields balsam of Peru, was given by Ruiz, in 1792, in his *Quinologia*. His memoir was translated into English by the late Mr. A. B. Lambert, and published in 1821 by him with a correct engraving of the plant, in his *Illustration of the Genus Cinchona*. Ruiz says the tree is known in Peru under the name of *Quinoquino*, and he calls it *Myroxylon peruiferum*, considering it to be identical with the *M. peruiferum* sent by Mutis to the younger Linnæus. This, however, would appear to be an error; Ruiz's plant being, according to Kunth and De Candolle, a distinct species from that of Mutis. Ruiz states that the tree grows in the mountains of Panatahuas, in the forests of Puzuzu, Muña, Cuchero, Paxaten, Pampahermosa, and in many other countries near the river Maranon, in low, warm, and sunny situations; but the Indians of these places do not collect the balsam.

In describing the balsam obtained from this tree, Ruiz makes some statements which I am unable to confirm. He says, " the balsam of Quinquino is procured by incision at the beginning of spring, when the showers are gentle, frequent, and short: it is collected in bottles, where it keeps liquid for some years, in which state it is called *white liquid balsam*. · But when the Indians deposit this liquid in mats or calabashes, which is commonly done in Carthagena, and in the mountains of Tolu, after some time it condenses and hardens into resin, and is then denominated *dry white balsam*, or *balsam of Tolu*, by which name it is known in the Druggists' shops."

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†† M. Guibourt (*Journ. de Pharm. et de Chim.*, 3e Sér., t. xvii., Févr., 1850) in noticing the *Myrospermum peruiferum*, Linn., mentions that Mr. Weddell collected in Bolivia a specimen of dry balsam of Peru from a species of *Myrospermum*; whether *peruiferum* or *pubescens* is not clearly stated.

Now, I have two authenticated balsamic substances obtained from this tree; one procured from the stem by incision, and known in commerce as balsam of Peru, the other obtained by expression from the pericarp, and called *white balsam;* but the latter in no way resembles the balsam of Tolu of European commerce, and can scarcely be the white balsam alluded to by Ruiz. Mr. Skinner, whose firm (Klée, Skinner, & Co.) at Guatemala largely exports balsam of Peru to Europe, never heard of any other balsams obtained from this tree. It is remarkable, however, that Mr. Klée, in his letter to Mr. Skinner (an extract from which is appended to this paper) speaks of the white balsam as being *balsam of Tolu.*

6. In 1823 appeared the sixth volume of Humboldt, Bonpland, and Kunth's *Nova Genera et Species Plantarum.* In this work, the plant of Ruiz and Lambert (called by Ruiz *M. peruiferum*, Linn.) is denominated *Myroxylum pubescens*, and the designation *Myroxylum peruiferum*, is retained for the plant sent by Mutis to Linnæus. These distinctions have been adopted by De Candolle, who, however, has substituted Jacquin's designation of the genus *Myrospermum*[*] for *Myroxylon* or *Myroxylum*[†]. But it is most unfortunate, that the specific name *peruiferum* should be retained for a plant which does not yield the so-called Peruvian balsam.

7. In 1834, M. Bazire, a French merchant, who lived for many years in Central America, informed M. Guibourt[‡] that the so-called balsam of Peru was not the produce of Peru, but of the coast near Sonsonate. He also gave to M. Guibourt some of the fruits of the tree which yields the balsam, but which, being deprived of their membranous wings, M. Guibourt failed to recognise as the fruit of *M. pubescens* (*M. peruiferum*, Ruiz and Lambert) and he, therefore, inferred that it was the produce of a different species. More recently[§], however, he has expressed an opinion that it is the fruit of the *Myroxylon peruiferum*, Linn. But on this point he has fallen into an error, the fruit being that of *Myrospermum pubescens*, De Cand. I may observe that the account furnished by M. Bazire (who is well known to Mr. Skinner) is quite accurate.

8. Such was the state of uncertainty which existed on this subject when Mr. Skinner kindly undertook to clear up the mystery by procuring for me specimens of the tree and balsams from Central America, and by kindly furnishing me with much valuable written and verbal information. By his aid I have ascertained,

1st. That the tree which yields the so-called balsam of Peru and the white balsam, is the species described and figured by Ruiz and Lambert (*Myrospermum pubescens*, De Cand.)

2dly. That *black balsam* (*balsam of Peru* of commerce) is obtained by incision into the stem.

3dly. That the *white balsam* is procured from the fruit by pressure.

4thly. That commerce exclusively obtains both of these balsams from the so-called Balsam Coast in Central America.

(To be continued in our next number.)

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[*] MYROSPERMUM, from *μύρον a sweet vegetable juice or oil*, and *σπέρμα, a seed.*

[†] MYROXYLON or MYROXYLUM, from *μύρον, a sweet vegetable juice or oil, and ξύλον, wood.*

[‡] *Journ. de Pharm.*, t. xx., p. 522, 1834.

[§] *Journ. de Pharm. et de Chimie*, 3e Sér.. t. xvii., p. 87, 1850; also, *Hist. Nat. des Drog.*, 4é., ed, t. iii., p. 441, 1850.

ON THE GAMBOGE TREE OF SIAM.

BY DR. CHRISTISON, V.P., F.R.S.E.

ALTHOUGH gamboge has been known in European commerce for nearly two centuries and a half, and its applications in the arts have been extended in recent times, the tree which produces it is still unknown to botanists.

The late Dr. Graham, in 1836, was the first to describe accurately a species of Garcinia, which inhabits Ceylon, and which is well known there to produce a sort of gamboge, not, however, known in the commerce of Europe. Resting on a peculiarity in the structure of the anthers, which are circumscissile, or open transversely by the separation of a lid on the summit, he constituted a new genus for this plant, and called it *Hebradendron cambogioides*. At the same period the author examined the properties of this gamboge, and found that it possesses the purgative action of the commercial drug in full intensity, and that the two kinds agree closely also, though not absolutely, in chemical constitution.

At an earlier period Dr. Roxburgh described, in his *Flora Indica*, another species of Garcinia, under the name of *Garcinia pictoria*, which inhabits the hills of Western Mysore, and which also was thought to produce a sort of gamboge of inferior quality. In 1847 specimens of the tree and its exudation were obtained near Nuggur, on the ghauts of Mysore, by Dr. Hugh Cleghorn of the East India Company's service ; and the author, on examining the gamboge, found it all but identical with that of Ceylon in physiological action, in properties as a pigment, and in chemical constitution. The same plant, with its gamboge was about the same time observed by the Rev. F. Mason, near Mergui, in Tavoy, one of the ceded Burmese provinces.

A third species, inhabiting the province of Tavoy, and also producing kind of gamboge, was identified by Dr. Wight in 1840 with Dr. Wallich's *Garcinia elliptica*, from Sylhet, on the north-east frontier of Bengal. Its exudation was long thought to be of low quality ; but, although this substance has not yet been examined chemically, it has been stated by Mr. Mason to be, in his opinion, quite undistinguishable as a pigment from Siam gamboge.

It is a matter of doubt whether Graham's character is sufficiently diagnostic to be a good generic distinction. But it was shown by Dr. Wight in 1840, that a well-characterised section at least of the genus Garcinia consists of species which have "sessile anthers, flattened above, circumscissile, and one-celled ;" and that all these species, and no others, appear to exude a gum-resin differing probably very little from commercial gamboge.

Still the tree which produces Siam gamboge, the finest and only commercial kind, continues unknown. A strong presumption however arose, that the last species was the Siam tree, as it grows in the same latitude with the gamboge district of Siam, and not above 200 miles farther west. But if the information recently communicated to the author be correct, the Siam tree is a fourth distinct species of the same section. In December last, he received from Mr. Robert Little, surgeon at Singapore, specimens taken from two trees which were cultivated there by Dr. Almeida, a resident of the colony, and which were obtained by him "direct from Siam," as the gamboge tree of that country. These specimens are not such as to allow of a complete description ; yet they are sufficient to show that the plant presents the characters of Wight's gamboge-bearing section of the genus Garcinia; but that it is not any of the species hitherto so fully described as to admit of comparison with it. The fruit is round, not grooved, crowned by a four-lobed knotty stigma, and surrounded by numerous sessile or subsessile aborted anthers, and by a persistent calyx of four ventricose fleshy sepals. The male flowers consist of a calyx of the same structure, a corolla of four ventricose fleshy petals, and a club-shaped mass of about forty subsessile anthers, closely appressed, connected only at the mere base, one-celled, flattened at the top, and opening by a circular lid along a line of lateral depressions; and there is no appearance of an aborted ovary amidst them. These are the characters of the three species presently known. These three species very closely resemble one another in general appearance and special characters. The new species presents the same close resemblance to them all; and, in particular, its foliage is undistinguishable from that of *Garcinia elliptica*, the leaves being elliptic, acuminate, and leathery, exactly as described and delineated by Wight. But it differs from them all in the male fruit and flowers being peduncled. The male flowers are fascicled, and have a slender peduncle three-tenths of an inch in length. The single young fruit attached to one of the specimens has a thick, fleshy peduncle, like an elongated receptacle, half as long as the male peduncle. All the other species hitherto described, have both male and female flowers, sessile or subsessile. As this difference cannot arise from a mere variation in the same species, the plant must be a new one. The evidence, however, that it produces gamboge, and more especially the commercial gamboge of Siam, is not yet complete, and, until further information on this point be obtained, which the author expects to receive in the course of the year, it appears advisable not to attach to it a specific name. A question may even arise whether the male flowers and the fruit here described may not belong to two species instead of one; but this is far from probable.—*Proceedings of the Royal Society of Edinburgh.*

[Although several months have elapsed since the above paper was read, its value is increased by the following extract of a letter from the author, which accompanied a copy of the paper:—]

"I am now able to inform you further, that the plant described in my paper, 'On the Gamboge Tree of Siam,' is diœcious; that additional specimens confirm all therein stated, and that the concrete juice of which a small portion has been sent to me, possesses all the sensible qualities of the finest Siam pipe-gamboge of commerce. I have no longer any doubt that we have hit on the true tree at last. There may be a shade of question raised whether Dr. Almeida's trees, of which he has three about twelve feet in height, may not belong to more than one species, and, therefore, which of them may be the true gamboge bearer. But I have myself scarcely any doubt that there is only one species. With a little more information, which I expect to have in six or eight months, I shall be in a condition to give a complete account of the matter. But meanwhile it may interest you and your friends to know what has been already done."

MITCHAM: ITS PHYSIC GARDENERS AND MEDICINAL PLANTS.

(Continued from p. 172.)

V. HENBANE.

In the notices of the Mitcham physic gardens, by Lysons, Malcolm, and others, no mention is made of henbane. We may, therefore, infer that its cultivation at Mitcham is comparatively modern.

Two varieties of henbane (*Hyoscyamus niger*, Linn.) are cultivated by the herb-growers at Mitcham, the biennial and the annual*.

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* See a paper on this subject by Dr. Pereira, in the Pharmaceutical Journal, vol. ii., p. 122.

Var. *α biennis.* Biennial black henbane.—The plants of this variety are stronger, more fully developed and branched, more clammy, and possessing in a higher degree the downy character and peculiar odour of the plant. The leaves are deeply incised and the flowers reticulated with deep purple veins. During the first year of its growth, the plant has no aërial stem, all the leaves being radical and stalked. In the autumn these leaves die, but the root survives the winter, and in the following spring sends up an aërial stem, which grows to the height of two, three, or four feet. The plant flowers towards the end of May, or in June.

Var. *β annua.* Annual black henbane.—This was at one time considered to be a distinct species, and was called *Hyoscyamus agrestris.* It is now admitted to be a variety only. The root is annual, the stem smaller, less branching, and less downy, the leaves are less deeply incised or sinuated, less hairy and clammy. It flowers in July or August. Altogether, it may be regarded as a weaker and shorter-lived variety. Not unfrequently its corolla is devoid of the purple veins. This peculiarity was at one time thought to indicate a distinct species, which was named *Hyoscyamus pallidus.*

Miller mentions in his *Gardener's Dictionary*, that a variety of *H. niger* was found by Professor John Martyn, near the castle at Cambridge, about the year 1729, with the corolla and anthers of a pure brimstone colour, without the least tinge of purple. The seeds being sown in the botanic garden at Chelsea, produced the very same variety. But he does not say whether this was an annual or biennial sort.

Mr. Babington states that this non-reticulated sub-variety grows wild at Esher, in Surrey. On inquiring of Mr. Arthur, of Mitcham, we found that this non-reticulated sub-variety was known to him, though it is not distinguished as a different sort by the herb-growers.

No positive evidence has hitherto been adduced of the superiority of the biennial over the annual sort; but the prevailing belief is, that the more fully developed, and longer-lived plant, in all probability, would more perfectly elaborate its peculiar juices, than the weaker and shorter-lived sort, and on this ground, it is presumed to possess greater activity. Although the present Pharmacopœia (1836) leaves the Pharmaceutist to use either sort, the forthcoming new London Pharmacopœia, it is reported, will direct the employment of the biennial variety.

The biennial plant ought to be gathered for medicinal use during the second year of its growth, at or soon after the commencement of inflorescence. The leaves at this stage are attached to the stem which bears the flowers, and when the plant is entire no mistake can be made, as the leaves of the first year have stalks which issue from the ground, as described by Dr. Houlton, and figured in this Journal, vol. i., p. 406 and 427. Mr. Squire has also pointed out the importance of distinguishing between the first and second year's leaves. When the stalk is removed the distinction is less easy, and the herb, as sold in the market, not unfrequently contains a mixture of the two kinds.

Although the above are the general distinctive characters, they occasionally merge into each other in individual plants, so that it is not always easy to distinguish the varieties or age, especially when the plants have been packed for travelling, and when they have been partially or entirely dried. Consequently the purpose for which the first year's leaves are chiefly used is for preparation in the dry state, in which they might, on a superficial examination, pass for the second year's leaves. Sometimes, however, so little care is taken to disguise the fact, that the long stalks betray the age of the leaves. There is a strong temptation to use the leaves in this stage of their growth, first, because they yield a return which would otherwise be sacrificed; and, secondly, because in brightness of colour they surpass the mature leaves, and, therefore, attract those whose primary object is to please the eye. But the instructions contained in the Pharmacopœia to select the plant at the time of inflorescence, are founded on correct principles. Mr. Moore, of Mitcham, informs us, that he never sells the first year's leaves, considering them worthless.

The annual and the biennial varieties are cultivated at Mitcham in distinct plantations. Formerly the biennial was chiefly met with, and it was at one time a disputed point whether henbane was ever matured during the first year. Since this point has been decided, the annual plant has come into cultivation, and it has gradually superseded the biennial to a certain extent, as it is found more profitable to realise the return in the shorter period. The seeds are sown early in the spring; as soon as the weather is favourable the annual plants are thinned, if necessary, and the crop is gathered about July or August.

The biennial plants are transplanted in the spring of the second year, and the gathering of the crop commences sometimes as early as May, and generally continues throughout June, and the early part of July.

It is usual to change the ground every two or three years; but this appears to be optional, as the plant grows wild in many places for ten or twenty years in succession, and some of the finest biennial plants are met with in the wild state. Mr. Bridger (at Mr. Moore's, Mitcham) informs us that he has seen specimens of these plants weighing as much as fourteen pounds, while the annual variety seldom exceeds three or four pounds, and the average much less.

The following report shows the variation in the product of extract arising from various circumstances. The notes were taken merely for private use, but they are quoted from the original memoranda, including the cases of failure in the result. With two exceptions the plant was furnished by the herbalist or grower, as the biennial variety in the second year of its growth. The leaves were separated from the stem, sprinkled with water and crushed, the stem being rejected.

June 13, 1844—Henbane, 3cwt. 21lbs., produce 14lbs. 9ozs.

The herb was crushed in a mill, and brought to the premises in the state of pulp. This plan was found not to answer: the delay occasioned by its transference through the different stages of the process impaired the quality, and although the produce was large it was unfit for use.

The plan of crushing the herb in a mill, although the most effectual in regard to the quantity of extract produced, is liable to this disadvantage, that when the herb is too much crushed, the inert fibres are reduced to a pulp, and may in part pass through the cloth with the juice. In the following cases the plant was bruised in a marble or stone mortar with a wooden pestle:—

			cwt.	lb.			lb.	oz.	per cwt.	
1845	June	19,	1	0		produce	2	10	2	10
"	July	12,	1	0		"	3	13	3	13
"	"	16,	1	0		"	3	10	3	10
"	"	23,	1	56		"	4	12	3	1½
1846	May	29,	2	0		"	4	10½	2	5¼
"	June	8,	1	39		"	4	14	3	2
"	"	13,	1	0		"	2	10	2	10
"	"	17,	1	0		"	2	8	2	8
"	"	30,	1	5		"	2	15	2	14
"	July	1,	1	7	(annual)	"	3	4	3	3½
1847	June	14,	1	40		"	3	12	2	2
"	"	22,	3	0		"	6	12	2	4
"	"	23,	1	56		"	4	9	3	0
"	"	24,	2	0		"	3	14	1	15
1847	July	10,	2	0	(old and bad) product not fit for use					
1848	June	2,	2	0		"	5	1	2	8½
"	"	3,	2	0		"	5	8	2	12
"	"	6,	2	0		"	6	12	3	6
"	"	7,	2	0	(old)	"	4	14	2	7
1849	June	6,	2	56		"	5	12	2	4
"	"	11,	2	0		"	5	0	2	8
"	"	26,	2	0		"	6	0	3	0
"	Aug.	6,	2	0	(annual plant, leaves only)	"	10	12	5	6
1850	June	21,	1	56		"	4	8	3	0
"	"	25,	1	56		"	3	14	2	15½

[Articles on Mints and Liquorice are ready for press, but have been deferred for want of space.—Ed. Ph. J.]

ON COLOCYNTHINE.

BY MR. WILLIAM BASTICK.

It must be a matter of surprise that the active principle of the pulp of the *Cucumis Colocynthis*, a drug in such extensive use and so highly esteemed, should not have received from Chemists a more complete examination to establish its true character. The medical prescriber might find in it an eligible agent when desirous of administering a powerful purgative in various and concentrated forms.

It is to be regretted that it has been never submitted to ultimate analysis, consequently its precise composition is unknown. It is, probably, an *oxyhydro-carbon* analogous to the resins, although differing from them in several of its properties, so as to induce the belief that it is a body *sui generis*.

Colocynthine is more soluble in water than resins; it is, like them, highly inflammable. It is an oily fluid at a temperature below the boiling-point of water, of a pale yellow colour; but at an ordinary temperature it solidifies into a reddish-brown resinous body. When dissolved in weak acids and alkalies, it separates unchanged upon the evaporation of the solution. It is not volatile when isolated, as might be supposed from the experience of those who have been engaged in preparing extract of colocynth, although in any form it is intensely bitter.

Colocynthine possesses neither basic nor acid properties, although Vauquelin and others have assumed to the contrary, having obtained a precipitate in its aqueous solutions by some metallic salts. But this reaction most likely arose from the colycynthine not being absolutely pure on which they experimented, as I do not find that it is thus affected when prepared according to a process which I have devised and found unobjectionable. Moreover, this method of preparation is incompatible with the existence of such a property.

The process I recommend is as follows:—Exhaust with successive portions of cold distilled water the pulp of colocynth previously freed from the seeds, until the pulp is deprived of its bitterness; filter the solution, and heat it to the boiling point; add, whilst hot, diacetate of lead, until no further precipitation ensues; when cold, filter, and to the clear liquid add diluted sulphuric acid carefully as long as a precipitate is thrown down; again boil to remove the free acetic acid, and filter to separate the sulphate of lead. By this means all the organic matter, except the colocynthine, is removed. Evaporate the filtrate cautiously to near dryness, and dissolve the colocynthine out of the residuum by means of strong alcohol, which leaves the salts undissolved as sulphates. By evaporating the alcoholic solution the colocynthine may be obtained pure.

This process is more complex than those recommended by Vauquelin and Braconnot; but, nevertheless, it is easy of execution. Colocynthine dissolves in strong sulphuric acid, but evidently is at the same time decomposed. The solution is dark brown, and upon being diluted with water a precipitate of a carbonaceous nature is formed. The acid seems to deprive the colocynthine of the elements of water.

Nitric acid produces a reaction with it that is analogous to the resins. It dissolves readily in cold nitric acid of the specific gravity 1.450, and after a few moments a vehement reaction ensues, attended with the evolution of great heat and fumes of nitrous acid, which shows that this body is oxidized when thus treated.

By mixing a moderate quantity of water with the acid solution, a voluminous precipitate is formed, which is redissolved by the addition of more water. This precipitate, when separated by a filter from the liquid and washed with ice-cold water to remove the excess of nitric acid, is found to have the characteristics of a weak acid (colocynthic acid?) It seems to be the only product of the oxidation of the colocynthine when thus conducted, although other bodies, doubtless, are formed by continuing the process of oxidation under the application of heat. This acid is of a pale yellow colour and bitter taste, but infinitely less bitter than colocynthine. It is inflammable, but not explosive. It is soluble in water, alcohol, and ether, and separates by evaporation from its solutions in an uncrystalline condition. With ammonia, potash, and soda it produces soluble compounds of a reddish-brown colour, but also uncrystallizable. It combines with the earths and metallic oxides, forming insoluble or slightly soluble compounds.

Dr. Gregory has suggested that colocynthine is probably a mixture of organic bodies; but my investigation of its properties, as here detailed, does not seem to support this opinion.

Brook Street, October, 1850.

CALIFORNIAN QUICKSILVER.

It is not improbable that gold may be found to constitute but a small proportion of the wealth derivable from California. It has for some time past been known that quicksilver abounds in that locality to an enormous extent. About twelve months ago a capitalist embarked with the requisite machinery for working a mine, and the result has more than realised his most sanguine expectations. On his return to England in quest of additional machinery, we are informed that he found a letter from the great Rothschild—the present mercury monopolist—requesting an interview with him in London—for what purpose it is easy to guess. We believe this request was not acceded to. The reports respecting the extent of the supply in the new mines are almost incredible. We have been informed that within a few weeks of the commencement of operations by the party alluded to, assisted by five men, a quantity of mercury was raised equal in value to £100,000 at the present market price. Even allowing a large discount for exaggeration, there is no reason to doubt that the supply is almost unlimited, and that the metal can be profitably sold at less than half its present price. The silver mines in Mexico, which have for years been unproductive, on account of the prohibitory price of mercury, may now be supplied on reasonable terms, and every branch of trade or manufacture in which mercury is used, will acquire a similar stimulus.

VARIETIES OF LINT.

Lint, as its name implies, is (or ought to be) prepared from linen. The course of preparation which it undergoes is intended to remove the harshness of the surface, rendering it soft, and suitable for application to wounds, as well as more absorbent.

Ordinary, or old-fashioned lint, of which there are several qualities, is usually made from old shirts, sheets, or other linen rags of various kinds, which are collected for the purpose, and constitute an extensive branch of trade with the "rag and bottle dealers." These rags are washed several times with soft soap and water, sometimes boiled with soda or pearlashes, and afterwards rinsed, first in blue water and lastly in clean water. Chloride of lime is, we believe, used by some lint makers to bleach the rags, but this is injurious to the texture and quality, and is avoided by the best makers, who depend entirely on soap and soda as detergents.

The rag, being well cleaned and dried, is next prepared by means of a machine resembling the framework of a small table without a top. To the back is fixed with a hinge a lever, supported by a spring, and extending to the front, at which extremity it is furnished with a knife resembling a chopper, about eighteen inches long. The lever is alternately depressed by a string attached to a pedal, worked by the foot, and raised by the spring before-mentioned. At each depression the knife impinges on the front of the frame, on which a strip of stout leather is attached. The rag is wound round a roller, and the edge of it brought forward on the leather under the knife. The knife is depressed, and at the same moment the rag is pulled back about the eighth of an inch. On the rising of the knife the rag is pushed forward to receive the next stroke, and the operation is repeated until all the fibres in one direction have been cut sufficiently to produce the desired surface. This operation, although it appears simple, requires some skill and experience, for unless all the fibres are cut uniformly the surface will not be smooth, and if the knife be brought down with too much force the rag would be cut through. At this stage of the process the lint when well cut appears remarkably soft and fluffy, but not quite smooth. The ragged edges are then trimmed, the lint is mangled or passed through rollers, and carefully folded in packets for sale.

We have been favoured with information on these practical details by Mr. Oyler, of No. 2, York Street, Camden Town, who is an extensive manufacturer of lint of the old kind, of every degree of fineness, from cambric to common sheeting. Of the cambric lint, of which Mr. Oyler gave us a sample, thirty-six yards (of eighteen inches wide) go to the pound, of the ordinary lint about four and a half yards, or when very thick and coarse, only three or four yards. The qualities most desired in lint are softness, a smooth surface, and moderate thickness. It should tear readily in one direction, and hold firmly in the other. Some lint will tear also across the grain, and this kind is preferred by Surgeons for the pocket case, as it is convenient to be able to dress small wounds without using scissors. For general purposes it is sufficient that it tears in one direction. When required for dressing wounds and ordinary hospital practice, rather thin lint is preferred, but for the application of lotions or for other purposes, where absorbing qualities are desirable a thicker lint is better.

We have stated that lint is, or *ought to be*, prepared from linen. The lint is more absorbent and less irritating to an abraded surface. Although cotton lint is not unfrequently sold, either mixed with linen or substituted for it, a lint maker who has a character to lose would run the risk of injuring his business by indulging in the practice, and he loses no opportunity of reminding his customers that his lint "has not a bit of cotton in it." Cotton being much cheaper than linen, is used chiefly on this account by those who push their trade by "underselling," and take advantage of the inexperience of their customers in judging of the quality. The linen rags collected for the manufacture of lint vary in texture, size, shape, and other qualities. Consequently, notwithstanding the care which is taken in the selection, there is scarcely to be met with a parcel of lint, even of the best quality, absolutely uniform. When the retailer has an order for a pound of large lint of a particular description, he must occasionally break open four or five pound packets to accommodate his customer. The source whence the old rags are derived has also been considered objectionable by persons who are at all fastidious; on which account various attempts have been made to introduce as a substitute a fabric of uniform texture and quality made on purpose. Hence the origin of several varieties of patent lint which have lately been in circulation. Of these we have before us

Tosswill's Patent Lint (two qualities, one finer than the other.)
Tipton's Patent Lint.
Wackerbath and Ross's "Superior Golden Flax Lint."
Taylor's Patent Lint (two kinds.)
Patent Lint, manufactured by the "National Linen Company."

Some of these lints are composed of linen, others of cotton. In order to give practical value to our description of each variety, we have furnished samples to two Metropolitan hospitals for trial, and hope to be favoured with reports in time for our next number, when we intend to resume the subject.

It is probable that the above list may not include all the varieties which are in the market. If this be the case, we shall be glad to receive such information as may enable us to complete the investigation, it being our object to give a fair and impartial report of every kind of lint which is manufactured.

MODES OF DISTINGUISHING COTTON AND LINEN.

Dr. Elsner, in a work entitled *Die chemisch-technischen Mittheilungen der Jahre*, 1846—1848, refers to the following methods .—

The trial by ignition, consists, according to Stöckhardt, in the fact, that a linen thread, when burned in a perpendicular direction, appears charred after the flame is extinguished, in a smooth, connected form ; whereas, the end of a cotton thread when similarly treated, presents a tufted aspect. This experiment always succeeds, provided the flame be blown out with force, and may be applied to tissues that are dyed, with the exception of the chrome-yellow patterns.

The potash test was introduced several years ago, by Böttger. He ascertained that linen placed in a boiling concentrated potash lye, becomes in the course of a couple of minutes, of a deep yellow colour, while cotton fabrics assume only a faint yellow tinge, and appear almost colourless. Mixed fabrics thus treated, exhibit yellow and colourless stripes. Stöckhardt and myself found, however, that by longer maceration than the above period, even linen becomes gradually paler and paler, and herein lies the uncertainty of the method. According to Böttger, the potash test applies only to white fabrics ; it may nevertheless serve for those that are dyed, if previously decoloured with solution of chloride of lime.

The method is, in a practical point, inconvenient, and not solely to be relied on.

The microscopic examination ought, under all circumstances, to be simultaneously employed along with the chemical tests. The flax fibres, of which linen is composed, appear under a magnifying power of 300 diameters as long, almost solid cylinders, with a narrow central canal; whereas, cotton fibres present a flattened tape-like aspect with a wide canal, and, not unfrequently from the thinness of their walls, have a twisted appearance, not unlike the turns of a corkscrew. :

Kindt published in Poggendorff's *Annalen* (vol. lxx., p. 167) a process for detecting the presence of cotton when mixed with linen, by means of sulphuric acid. This destroys the cotton fibres, while the linen remains undamaged. Care must be had that the sulphuric acid be not allowed to act longer than from half a minute to two minutes, and that, before its employment, all dressing be removed by boiling water.

An elegant mode of applying this test is to place a single thread of the mixed fabric on a plate of glass, then to let fall upon it a drop of concentrated sulphuric acid. On examination by a common magnifying glass, it will be seen that a solution of the cotton fibre has taken place, while the flax fibres retain their peculiar twisted form.

Frankenstein has introduced the test by oil. It is based on the fact that linen textures, when thoroughly imbued with olive oil, become transparent like oiled paper; those of cotton, on the other hand, remain white and opaque ; mixed fabrics appear white with transparent stripes. This test will not serve for dyed fabrics, unless previously decoloured with solution of chloride of lime.

My own method is derived from the circumstance that alcoholic tinctures of all vegetable substances containing a red colouring matter, possess the property of tinging flax fibres uniformly more deeply than those of cotton. Accordingly, linen fabrics always receive a deeper dye from the tinctures in question than cotton ones. The best substances for the above purpose, are the alcoholic extracts of cochineal and madder; one part of the dye stuff is allowed to remain in contact with twenty parts of alcohol (sp. gr. 0.847) during twenty-four hours without artificial heat, after which the filtered tincture will be ready for use.

In the cochineal tincture pure cotton wool receives a bright red, and linen a violet tinge,

In the madder tincture, cotton acquires a clear yellow, and linen a yellowish-red, dirty orange hue. These coloured phenomena take place after a few minutes. If the fabric consist of a mixture of cotton and flax, it ere long presents a variegated striped appearance. This procedure answers well when there is a considerable amount of cotton mixed with the linen, but otherwise, is not so definite.

As a general rule, it is expedient to resort to several of the above methods, and in the following order, viz., the examination by the microscope, the oil-test, the sulphuric acid test, and the test by burning.

The tincture-test may be employed when the experimenter does not hesitate to institute some intermediate operations. The potash-test, according to the results of Stöckhardt's researches, is not to be depended on.

THE PREPARATION OF SPIRITUS ÆTHERIS NITRICI.

BY MR. JAMES GRANT.

The preparation of Sp. Æth. Nit., according to the Pharmacopœia, is a very troublesome process, and not only does the product vary very materially with the quantities of ingredients acted on, but is also seldom absolutely pure. The low sp. gr. given for this preparation, would lead one to infer that it contains but very little nitrous ether.

The process pointed out by Liebig, consists in passing nitrous acid (NO_3) generated by acting on starch with nitric acid in a water-bath, into a mixture of alcohol and water, from whence the nitrous ether ($Ae\,O, NO_3$) distils in a continuous stream, and when freed from alcohol and water, is absolutely pure, but the reaction between the starch and nitric acid is frequently so violent as to be quite unmanageable. By adopting the following modification of this plan, I have succeeded in preparing nitrous ether with the greatest ease, and equally pure, and, by simply mixing it with the proper quantity of rectified spirit, it yields the sp. ætheris nitrici of the Ph. L.

℞ Acid Nitrici, s. g. 1.36, f ʒj.
Sp. Vini Rect., f ℥x.
Pulv. Amyli, ʒij.

Mix the starch with one ounce of the spirit in a glass flask, and to these add the nitric acid, apply a gentle heat, if necessary, until slight effervescence takes place, and pass the disengaged nitrous ether first into a washing bottle, to free it from adhering acid, and then into the remainder of the spirit. Of course, if nitrous ether be required, instead of passing it into spirit, it must be dried and condensed in a well-cooled receiver. The action sometimes takes place spontaneously in the flask, and goes on very quietly for a long time, but should it become at all violent, the flask should be immersed for a few minutes in cold water.

28, *Old Market Street*, *Bristol.*

SYRUPUS IODIDI FERRI.

BY MR. W. TIZIER, APOTHECARY.

As the King and Queen's College of Physicians in Ireland have introduced this valuable therapeutic agent into their newly established formulary, I would be glad to record a few practical points of interest attached to its preparation, for the purpose of simplifying and completing the process, especially as they appear to have been overlooked in the details of every prescribed formula since its first introduction into notice by Dupasquier.

The new Dublin Pharmacopœia directs, "to introduce the iodine, iron, and water, into a glass flask, and apply a *moderate heat* until the solution loses its red colour." Now, as the great success of the first part of the process depends on the rapidity with which it is conducted, without any unnecessary exposure to the air (but what cannot be avoided) until a neutral solution be effected, there is evidently considerable time lost, and danger of decomposition incurred by pursuing these directions. This circumstance appears more remarkable, when we are aware that all extraneous application of heat is superfluous. Iodine and iron exert so powerful an affinity for each other in the presence of water, as to combine with the greatest facility, generating a large amount of sensible heat; at the same time it is only necessary then to bring their particles *constantly in immediate contact with each other*, to fulfil this end to our entire satisfaction, and for this purpose, two practical points must be attended to, first, *to rotate* the flask containing the mixed substances briskly and diligently for some moments in the hand, until the deep red colour of the solution disappears, and is succeeded by its olive-green pellucid and normal one, which, when tested, should be perfectly permanent to the action of amidine. And, secondly, to break down the iron turnings as small as possible, carefully freed from any adhering oxide, by which means a greater superficial extent will be exposed to chemical action, and thus ensure rapidity of combination more easily.

By careful attention to these apparently insignificant points, the preparation, in its first stage, will be divested of much of its practical difficulty, and rendered easier of execution, while risk from decomposition will be entirely obviated. Care should be taken to filter the solution (after testing it) into the saccharine mass, which preserves the neutral iodide of iron so far as to preclude the possibility of change from any subsequent heat that may be employed.

Kingstown, near Dublin.

ON THE USE OF LEAD IN THE MANUFACTURE OF SUGAR.

SINCE the publication of the article on the above subject, in the last number of this Journal, a letter has appeared in the *Times* from Mr. Warington, which, although it contains no new facts, we transfer to our pages, so that our account of the discussion on the very important question at issue may include the arguments adduced on both sides.

September 26, 1850.

GENTLEMEN,—I have attentively perused the printed report made by the professors of chemistry and medical jurists on the subject of Dr. Scoffern's patent for refining sugar, and beg to hand you the following observations thereon. It appears that the patent process, as directed in the specification by Dr. Scoffern, was followed out three several times by Professors Thomson, Graham, and Hofmann, without any trace of lead being found in the results, such results having been submitted to rigid analysis. The process is therefore quite unobjectionable in every respect on this evidence.

Now, it appears that the results of the several examinations, as detailed in the report, are all obtained from four pounds weight of the sample operated on, and in terms of the equivalent of lead in the form of sulphate of lead. In what state of combination the lead really existed in the samples is not specified, or whether it were in a poisonous or innocuous form. This was a most important point to have determined, as there is every reason to believe that in the results of the ordinary process of refining sugar, the lead exists in the poisonous form of carbonate and oxide; while, in the new process, if it existed at all (as far as the operations of that process are involved), it would be in the form of sulphite, mechanically suspended; and this I consider could only arise from imperfection in the filtration. This sulphite appears to be perfectly innocuous and insoluble, and the facts mentioned in your letter of the 17th inst., afford indisputable evidence on this point, irrespective of the results of Dr. Gregory's experiments*: "For one year and ten months, the members of a firm, consisting of four gentlemen, employing Dr. Scoffern's process, have used exclusively the sugar and treacle so made in their families; that their operatives, men and boys, not only are permitted to eat an unlimited quantity on the premises, but each individual is allowed one pound weight per week of the bastards for his own consumption; and that during the whole of this period, no case of indisposition has occurred amongst the consumers of any of these products, although the Asiatic cholera prevailed in the neighbourhood for several months.

The mode of analysis adopted by Professors Thomson, Graham, and Hofmann, for the estimation of the lead, which they state to be very easy and complete, and the sufficiency of which was tested, appears to me, judging from the published results, to be very unsatisfactory. For instance, we find it stated that one and the same quantity of treacle, made by the old process, yielded in one experiment, 0.62, and in a second 1.21, or very nearly double the quantity. Surely, a method of analysis that will yield so widely differing results from the same sample, cannot be received as complete or satisfactory.

The specimen first examined is an authenticated sample of West India sugar, which yielded lead equivalent to 0.39 grains of sulphate from the four pounds. Loaf-sugar, the produce of the old refining operations, is next examined; but only one sample of bastards, or of treacle, is mentioned as having been submitted to experiment, and all these samples the produce of one sugar-house. The result on the loaves is left doubtful, on the ground that not so much lead as is equivalent to 0.05 of sulphate of lead could be present—so it is stated. The bastards yielded 0.25, and the treacle 1.21. These are the maximum results.

The products of the process of which the patent forms a part, as obtained from parties who had been working only for a short period, are then experimented on. Now, it must be obvious, that the first introduction of a new process, however perfect, and however suitable to the large scale, will at first, to a certain extent, be attended with difficulties in its practical working out. The evidence of Mr. Goodhart's letter proves this to be the case in the present instance. He says, "We have to remark that, owing to the defective nature of the filtering apparatus, after the gasing operation, the liquor was at times turbid (though we have since remedied that defect, and obtained constantly a brilliant liquor); but it is probable that in some of the sugars, as per samples herewith sent, a portion of sulphites may be detected; but we believe no other traces of lead, further than may have been caused by contact with leaden pipes and cisterns, which we, in common with most other sugar-refiners, make use of, as also white lead, in painting the iron moulds."

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* Letter from Messrs. Coode, Browne, and Co., Sept. 7, 1850.

No examination appears to have been made of the syrups obtained by the new process before they were brought in contact with the leaden pipes, cisterns, and painted moulds alluded to in this letter; and all the lead found by Professors Thomson, Graham, and Hofmann in these samples may really have arisen from this source; and, if so, a great injustice may have been done by the report from want of proper circumspection.

In regarding, therefore, the results obtained by Professors Thomson, Graham, and Hofmann from the samples procured under these circumstances, it seems to me that a much nearer approach to accuracy will be attained by taking the minimum weights as evidence of the working out of Dr. Scoffern's process, which process they themselves report as perfect. The results, then will stand thus:—In loaves, no lead; bastards, 0.48; in the treacle, 0.87; or, by comparison—

	Old process.	New process.
Loaves	0.05	None.
Bastards	0.25	0.48
Treacle	1.21	0.87

The report of the medical jurists, Drs. Pereira, A. Taylor, and Carpenter, is of no value whatever, inasmuch as it is based on fallacious grounds; for they state, "Our investigation practically resolves itself into the inquiry whether 1.261 grains of metallic lead contained in a salt of lead, capable of becoming dissolved by the juices of the alimentary canal, swallowed weekly for probably many months, are capable of producing serious injury to health."

Now, there is no evidence whatever in the report to show that the lead stated to be contained in the samples examined was in such a state as that required by these gentlemen, and on which supposition their report is entirely founded; nay, worse, they adopt the very extreme result obtained from a sample of treacle which was stated in writing by the manufacturer to be objectionable from a defect in the working of the filtering apparatus, and on this assumption they call in question the chemical accuracy of the patent process.

In conclusion, I beg to state that I can see no reasonable grounds why the patent process should not be as perfect upon large as upon small quantities; the lead employed at present having been rendered insolubl by the sulphurous acid, the next operation is the mechanical one of removing the innocuous compound from the syrup—an operation in which there can be but little difficulty with a proper filtering material.

The concluding paragraph of the report is at variance with what has been repeatedly published and well-known before the introduction of Dr. Scoffern's process—namely, that the acetates of lead were the best defecators of sugar solutions. The problem was how to use them safely. I consider that this problem has been fully and satisfactorily solved, and the report itself tends to confirm me in that opinion.

I remain yours, respectfully,

Messrs. Coode, Browne, and Co. ROBERT WARINGTON.

We may observe, with reference to this letter, that Mr. Warington would have contributed more to his reputation as a Chemist, if, instead of criticising the report of the Chemists employed by the Government without having sufficient data on which to found his strictures, he had endeavoured to elucidate the subject by the results of experiments and observations of his own. Had he done this, he would not have fallen into the inconsistency of first representing the lead found in treacle as an insoluble salt merely held in suspension; and then, taking exception to the results of the analyses of two separate portions of a specimen of treacle, *because* the quantity of lead found in each portion was not the same. As well might he repudiate the accuracy of the analyses of two specimens of soil taken from different parts of the same field, *because* the quantities of lime or alumina contained in them were represented to be different.

The admission that an accident, to which the process is daily liable, (namely, a slight flaw in the filter) is capable of producing serious results, is in itself an admission that the process, in such hands would be dangerous.

His observations on the report of the medical jurists are equally subject to objection. The opinions of Drs. Pereira, Alfred Taylor, and Carpenter, he says, are of no value whatever, because they have assumed the lead found in the sugar to be in a state capable of becoming dissolved by the juices of the alimentary canal, while he, Mr. Warington, upon insufficient data, assumes the contrary. Had he tried a few simple experiments, which have subsequently been made by Mr. Redwood (see page 220) he would have found the grounds upon which the medical opinions were founded to be fully substantiated. Were further evidence required on this point, it is afforded in the subjoined communication.

ON SULPHITE AND SULPHATE OF LEAD.

BY PROFESSOR EDWARD SOLLY.

The remarks on the subject of the existence of salts of lead in sugar, in the last number of the Pharmaceutical Journal, induce me to draw your attention to one or two facts connected with the subject, which appear to have been overlooked by those who have recently written on the sulphite of lead; and which, therefore, may perhaps be worthy of notice in the next number of the Journal.

It is generally stated, that the sulphite of lead is insoluble in water, and the conclusion which is drawn from that fact is, that it *therefore* cannot be poisonous. Now, independently of the fact to which you have referred, that insoluble substances are sometimes found to be absorbed into the system, it is surely proper, in a chemical question like this, not merely to ascertain that the salt is insoluble in pure water, but also to investigate the action of saline solutions on it, and more especially of those substances to the action of which it is likely to be exposed in the human stomach.

Sulphite of lead, though it may be insoluble in pure water, is, nevertheless, very readily acted on by various saline and acid solutions. Thus, many of the chlorides render it soluble, and it is decomposed with great facility by muriatic acid. I have found water, which was slightly acidulated by the addition of a few drops of muriatic acid, even at common temperature, rapidly decomposes the sulphite of lead, forming a solution of chloride of the metal. I should much doubt whether, in the presence of free muriatic acid, the sulphite of lead is much less poisonous than the carbonate.

In connexion with this subject, I would also mention another point, which, I believe, is often overlooked. It is well known that the sulphuric acid of commerce, amongst other substances, contains a notable quantity of sulphate of lead, and that when the acid is diluted, it becomes slightly turbid from the precipitation of that salt. In preparing dilute sulphuric acid for pharmaceutical use, therefore, Chemists should leave the acid some days, that the whole of the lead may precipitate. I have, on more than one occasion, recently seen a considerable quantity of sulphate of lead in the bottles of dilute sulphuric acid in Chemists' shops; and, indeed, on two occasions saw an assistant proceed to shake up the contents of the bottle well before pouring some out. It is possible that sulphate of lead may not be poisonous, but when sulphuric acid alone is prescribed, there is no need to add even a small quantity of sulphate of lead.

Tavistock Square, October 9, 1850.

THE POISONOUS QUALITIES OF OXIDE OF ZINC.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—I have your Journal for this month, and perceive two articles on the Poisonous Qualities of the Oxide of Zinc. The latter one, by Dr. Bouvier, I am able from personal experience to corroborate. When first this article began to excite public attention (for my own satisfaction, as well as to verify the statements of various parties who had called upon me holding out inducements to work a French patent) I had caused to be erected at our works, Rotherhithe, a small furnace, which I work personally, but which, from some trifling imperfection which was afterwards remedied, blew the flowers of zinc out at the feeding place in my face, the consequences were precisely as described by Dr. Bouvier, with this difference, that not being a workman, I desisted in time to save myself from the more serious consequences that appear to have attacked those who earned their living by working it, and who of course could not so readily leave off as I did.

I may mention that I was at the time using the metal, zinc, cast into thick plates or slabs as it is usually sold, with I think a sign of a lamb and banner on it, which may serve as some guide as to the purity of the product I inhaled.

In conclusion allow me to say, I do not write this with any view to publication, as being notoriously a lead manufacturer, I might be accused of too great partiality for my own product. I believe the manufacturers of the oxide of zinc have not yet succeeded in making it twice alike, which I did accomplish at last in my small apparatus, and may, perhaps, some day have occasion to bring before the public.

I am, dear Sir, yours faithfully,
Andrew B. Brandram.

17, *Sise Lane, London, October* 1, 1850.

[In compliance with our request Mr. Brandram has consented to the publication of this letter. Ed.]

KIDSTON'S MECHANICAL LEECH.

In our number for March, 1849 (vol. viii., p. 426) we described and figured a small instrument, intended to supply the place of leeches, and acting on the principle of a cupping machine. This instrument, although ingenious, had certain defects, which do not exist in the one before us. The spring, by means of which the incision was made and the vacuum produced, was composed of vulcanised Indian rubber, a substance, which, after a time loses its elasticity, and requires renewal, and the maker residing abroad, the frequent necessity for repair, was a source of inconvenience. Mr. Kidston has remedied this defect, by the use of an iron spring attached to a piston. The instrument is also more neatly executed, and the contrivance for making the incision is superior.

Before application, the piston rod A B is raised, and it is retained in its position by a spring C. The piston rod D is then depressed, and the instrument applied to the part. By releasing the rod D, the piston rises, producing a partial vacuum. The spring C is then touched, which releases the piston connected with a three-bladed lancet, and an incision is instantly made. The glass E is next applied, and renewed until the requisite quantity of blood has been drawn.

Fig. 1.

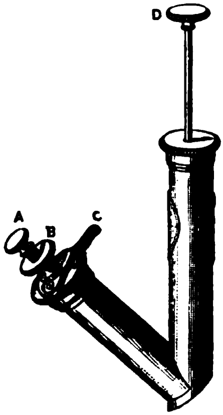


Fig. 2.

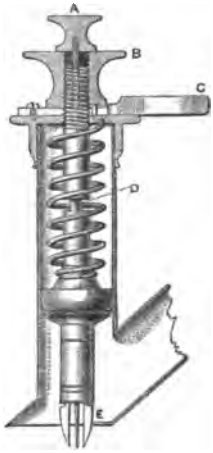


Fig. 3.

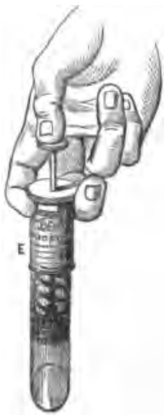
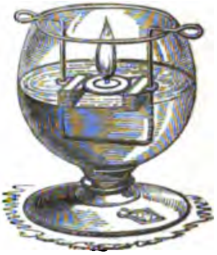


Fig. 1. The Instrument.
Fig. 2. Section of the portion containing the lancet (the full size).
Fig. 3. The glass, showing the piston partially depressed.

We are not so sanguine as to suppose that this instrument will ever supersede the use of leeches, nor do we believe that any mechanical invention would, under all circumstances, supply the place of that valuable animal; but when leeches are not at hand, or when a patient has a great repugnance to leeches, a substitute may be found useful. It has also economy to recommend it, as the instrument may be used an indefinite number of times, while its value in leeches would probably be expended in two or three applications.

NIGHT LIGHTS.

BY MR. ALFRED BIRD (BIRMINGHAM).

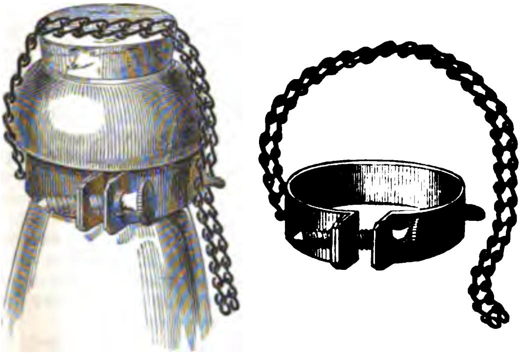


The cut scarcely requires any verbal description to make it intelligible. The float which supports the wick is kept in its place by the wire, the ends of which rest on the edge of the glass. The light is economical, emits no smell or smoke, and is not liable to accident. The kind of oil used is olive or Genoa oil, of the second quality. These lights, as well as the oil, are extensively sold by Druggists in the country.

Directions: [Half fill the glass with oil, put a German wick on the floater, and drop it into its place.

CORK HOLDER. (*Serre-Bouchon*).

Sold by M. Fèvre, Rue St. Honoré, Paris.



This contrivance is ingenious, and likely to be useful. The cut sufficiently represents it without any further description.

THE FIRE ANNIHILATOR.

The known effect of carbonic acid, and some other gases, in arresting combustion led to the invention of a machine, the object of which was to assist or supersede fire-engines. This machine, which was patented by Mr. Phillips, consists of a strong iron vessel containing nitrate of potash, sawdust, powdered coke and coal, also chlorate of potash and oil of vitriol, the latter contained in a small glass vessel to be broken at the time of using the instrument. The products of combustion are carbonic acid, carbonic oxide, and nitrogen, which, with the vapour of water, issue with considerable force from the machine, and are theoretically incompatible with combustion. Experiments on a small scale in the lecture-room had led to a belief that this discharge would effectually arrest the progress of flame under other circumstances, and a fire annihilator company was formed to carry out the project.

On the 8th of June of the present year an experiment was tried for the purpose of testing the efficacy of the apparatus. A brick house was erected on the marshes of Woolwich, having three floors, wood partitions and staircase, and pieces of timber nailed together to represent furniture. Shavings were also sprinkled on the ground-floor. One four-wheeled two horse annihilator, two hand annihilators on two wheels, and several smaller ones, were in readiness, and the shavings on the ground-floor were ignited at 24¾ m. past 12.

At 30½ m. past 12, one of the two wheel annihilators was run close to one side of the building, and two minutes afterwards a similar engine was brought to the other side. One of these not being close to the building was furnished with a hose, which was almost immediately blown off, and no effect was produced by either machine. At 35 m. past 12, the large annihilator was brought up, but the hose was also blown off: the machine was run within about two feet of the front, but the wind carried the vapour round the corner of the house, and it was expended to no purpose.

At 54 m. past 12 the house was nearly destroyed, and two of the hand annihilators were directed to the ruins on the ground floor, but failed to extinguish the fire. At 10 m. past 1 all the joists, except one, had fallen in: about this time a large-sized annihilator was observed among the ruins, which could not have been placed there during the fire, and therefore must have been on one of the upper floors previously.

It was the opinion of some spectators on the occasion that the machines were not well managed, but that even with the best management they could not have extinguished the fire.

Another experiment was tried on the 8th of October (last month) at Battersea Fields. The experiment was conducted by the representatives of the Fire Annihilator Company, and several persons desirous of witnessing the result attended. A house, constructed as in the previous experiment, was ignited in three places between 11. 13, and 11. 14 a.m. At 11. 17 two four-wheeled annihilators were set to work, one at a second-floor window in front, by means of a short canvass hose and long iron tube; the other, having two deliveries each, furnished with an iron tube, was directed into two back windows on the ground and first-floors.

At 11. 21 a large hand-annihilator was discharged at the side window. The four-wheeled machines were repeatedly charged; the hose of the one with two deliveries took fire, and was burned off. By the aid of many buckets of water, the fire on the ground-floor was nearly extinguished by 11. 37½, and the supply of water on all the floors was continued for a considerable time afterwards to extinguish the red fire.

It subsequently transpired that men were stationed on both the upper floors, with ten or twelve hand-annihilators, to extinguish the fire in each room before it had gained the ascendancy; and no doubt could be entertained on the subject, from the number of machines observed afterwards undergoing the process of cooling, which machines were not used outside the house.

On examining the house afterwards, it appeared that the fires in the first and second floors had been extinguished almost before any mischief had been done; several parcels of shavings were untouched by the fire, the greater part of the timber scarcely charred, the staircase uninjured, and a piece of calico which hung against the staircase window was very little discoloured.

When it is considered that this experiment occupied only 23½ minutes, that about fifteen annihilators previously prepared were in operation at different parts of the house, inside and outside, and that copious libations of water were called into requisition, it cannot be said that the result of the second experiment was much more favourable than that of the first, to the character of the annihilator.

The conclusion to be drawn from these experiments is in accordance with that which might have been predicated from a theoretical consideration of the subject. The fire annihilator may be valuable to the lecturer as a popular illustration of the influence of carbonic acid on combustion. It might be useful in the hold of a ship or other confined space, when applied immediately on the appearance of flame, in the absence of a strong current of air, and before the heat has become intense; in short, in cases in which a few pails of water would answer the same purpose. But under the ordinary circumstances of a fire in a dwelling-house or warehouse, when the flames have been raging for twenty minutes or half-an-hour, when the heat is so intense that neither annihilator nor fireman could approach within several yards, the machine would be utterly useless. The gas could never come in contact with the burning materials, it would be either blown away by the surrounding currents, or instantly rarified and driven off by the heat of the conflagration.

NOTE ON DR. GREGORY'S PROCESS FOR PREPARING PURE CHLOROFORM.

BY PROFESSOR CHRISTISON.

The process proposed by Dr. Gregory for preparing a perfectly pure chloroform, has given occasion to various notices in contemporary journals, some of them laudatory, and others the reverse. Among the latter may be mentioned the statement of a late writer in the Pharmaceutical Journal, that chloroform prepared in Edinburgh, avowedly by the process in question, was found, in Liverpool, to have undergone decomposition, to have become loaded with chlorine, and to be quite unfit for use. In Dr. Gregory's absence on the continent, I have felt it to be my duty to make inquiry into the truth of this statement ; and the result is, that no less than three manufacturers in Edinburgh have tried the process on a considerable scale, and that all have failed to obtain a permanent article. A chloroform of fine quality is obtained in the first instance ; but it does not keep many days ; and ere long it becomes so loaded with chlorine that its vapour cannot be inhaled.

I have not had time to investigate fully the cause of this unexpected phenomenon, or to ascertain whether it is an inherent fault in the process, or depends rather on some manipulation having been practised or left out, which Dr. Gregory may have neglected to particularise. But this much seems certain, 1. That chloroform purified by one treatment, with pure sulphuric acid, free of nitrous acid, keeps perfectly ; 2. That such chloroform, if left in contact with ordinary sulphuric acid, containing, as it generally does, an impregnation of nitrous acid, will, in less than twenty-four hours, undergo decomposition, and afterwards rapidly evolve chlorine ; 3. That if a drop or two of nitrous or common nitric acid be added to an ounce of pure sulphuric acid, the decomposition goes on with far greater speed ; 4. That if the sulphuric acid be carefully freed of nitrous acid, so as not to affect solution of green vitriol, no change may occur in the chloroform for an entire week ; 5. But that, nevertheless, even with pure acid, decomposition begins at last, so that in four weeks the odour of chlorine is intolerable. It therefore seems probable, that the best chloroform cannot resist the protracted contact of sulphuric acid ; and that even the repeated action of that acid—for example, when used to effect thorough purification, according to the method of Dr. Gregory, produces some change, which, though unappreciable at first, gradually leads to decomposition in the end. Why this happens, whether it always happens, or in what circumstances, are questions which we are not prepared to answer. It is probable, however, that Dr. Gregory will be able, ere long, to do so satisfactorily; for there is a specimen of chloroform in his laboratory, which was prepared six months ago by his process, and which is still quite unaltered. Meanwhile, it is obvious that manufacturers ought not to adopt that process until farther explanations shall have been given. It may be added, that the Edinburgh manufacturers have recalled from their customers the chloroform which had been manufactured by the repeated use of sulphuric acid; and that the spurious article is very easily known by the pungency which is added to the purely etherial odour of the uncontaminated preparation.—*Monthly Journal of Medical Science.*

RELATION BETWEEN THE GRADUATIONS OF THE CENTIGRADE AND FAHRENHEIT THERMOMETERS.

BY M. D'ABBADIE.

It has been customary to reduce the indications of Fahrenheit's thermometer to those of the Centigrade by the following formula:—

$$C. = \frac{(F.-32°) \times 100}{180}$$

In which C. and F. indicate respectively the degrees Centigrade and Fahrenheit.

This formula is founded on the supposition that 212° Fah. is equivalent to 100° Cent. This, however, is not strictly the case, for in France the definition of the point 100°, is the point at which the mercury stands in the vapour of boiling water, while the barometer, at zero of temperature, stands at 760 millimetres (29.922 inches). In England, on the other hand, the boiling point of water, or 212° Fahr., is determined under a barometrical pressure of 761.9862 millimetres, or 30 inches. This difference produces one, small it is true, but which is quite appreciable in a good standard thermometer, the boiling point of water on the centigrade scale, if determined at 761.9862 millimetres (30 inches) being 100.0727° at 760 millimetres (29.922 inches).

To this correction must be added another, which amounts to $\frac{1}{10}$ of the preceding, and which depends on the difference in the force of gravity at London and at Paris, these being the towns at which the English and French standard thermometers are respectively graduated. If the force of gravity at Paris be represented by G, and that at London by g, estimating G and g from the observed length of the pendulum, there will be,

$$\text{Logarithm} \frac{G}{g} = \bar{1}.9998797.$$

We should, therefore, have 759.785 millimetres as the height of the barometer at zero of temperature at London, when a standard thermometer graduated at Paris shall indicate 100° Cent. in boiling water at the former place. The difference is equal to 0.215 millimetres, which corresponds to 0.0079° Cent.

These two corrections being in the same direction, the standard thermometer graduated at Paris should indicate 100.08066° Cent., to correspond with the point marked 212° Fahr. of an English standard instrument graduated at London. The formula for reducing the indications of the Centigrade to those of Fahrenheit's thermometer should be modified to the following:

$$C. = \frac{(F.-32°) \times 100.08066}{180}$$

This correction is certainly small; but in observations, where accuracy is necessary, it is important that even a slight error of theory should not be added to errors of observation.—*Comptes Rendus.*

MEDICINE AND PHARMACY IN TURKEY.

BY M. LANDERER, ATHENS.

In all the large towns of the Ottoman empire, especially at Constantinople, Smyrna, Thessalonica, and Prussa, there are very distinguished physicians. These practitioners are chiefly Greeks, Germans, Italians, and French, who, having studied abroad, have come to follow their profession in the East, where, twelve or fifteen years ago, the want of qualified physicians was much felt. It may be safely stated, without depreciating other medical men, that German doctors and those who have studied in Germany, enjoy throughout the East the greatest reputation, and obtain a preference over all others. In the provinces and in the army, physicians of scientific education are rarely found, and the practice is confined to empirics, who have previously been Pharmaciens. Many of them have originally been employed by scientific physicians, and have become suddenly *hekins* (the name of Turkish physicians). Although most of them do more harm than good, yet there are some who, in the course of years, have acquired practical knowledge, and perform real service to sufferers. These *hekins* are also Pharmaciens, and furnish the medicines themselves, always, however, with the consent of the patients and their relations. In proportion as the disorder appears likely to require more or less treatment, they require for a complete cure one, two, or as much as ten thousand piastres.* As soon as the contract is made a third of the amount is paid in advance; when the patient is in a state of convalescence the second third, and the remainder when the cure is effected. If the patient happen to die during the treatment, the doctor receives nothing beyond the amount which had been paid in advance. Besides the above fees, which are considerable, the *hekins* receive from persons of high rank remarkable presents, consisting of horses, pipes ornamented with amber, worth sometimes from 6000 to 10,000 piastres, diamond rings, precious stones, &c. At the same time the persons attached to the Physician, whether as Surgeon or Pharmacien, obtain presents of less value, although not unimportant. If a *hekin* has succeeded in curing a distinguished personage his fortune is made, and he acquires the name of *hekin padischa* (first physician).

Another class of doctors are the Surgeons (*gerrahs*), and also the barbers (*berber*), who, in the absence of physicians, perform the functions of *hekins*. They are found in their shops, where they attend patients, who receive the medicine on the spot. They also perform the minor surgical operations, sometimes in sight, to attract the notice of passers by, and the most ordinary operation is then vaunted by the friends of the *gerahs*, and by persons hired for the purpose, as an operation full of danger. In these shops or magazines are kept, in old boxes not labelled, the medicinal substances most in use, such as sulphur, amber, sarsaparilla, corrosive sublimate, jalap, and tartar emetic. Serpents are suspended in the middle of the shop, or placed near the windows in glass jars. Patients can either purchase or borrow leeches and syringes.

As a third class of doctors we may mention the *kombojanites*, charlatans of the first order. They are met with especially in Asia Minor, Epirus, Macedonia, and Thessalia. They are criers at fairs, selling at stalls a number of remedies for divers diseases, and inventing all kinds of expedients to convince the credulous public of the efficacy of their specifics.

In Turkey, up to the present day, no law exists prohibiting foreign doctors from establishing themselves in any part of the empire, without the authority of the Government. Any person may practice medicine as he thinks proper.

As for Pharmacy, this profession is in Turkey in the most deplorable condition. It is only in the first towns in the empire, and principally in Constantinople and Smyrna, that there are among a crowd of wretchedly bad Pharmaceutical establishments, a few which may be compared to those of Italy and France. Moreover, those who keep shops are many of them French, but the majority are Italians and Greeks. The shops of the latter are in much better condition than those of the Italians. The most detestable of all, and which scarcely deserve the name of "Pharmacies," are those kept by Armenians, Jews, and the Turks themselves. In the town of Constantinople, properly so-called, or the town of Byzance, the number of these small shops, where five or six persons can scarcely move, amounts to several hundreds. All their supply of medicines consists of about fifty or sixty different kinds, enclosed in boxes, in large glass jars of different sizes, and in small drawers. Most of these substances have no labels, from which circumstance the most unpardonable mistakes continually occur. In other shops, which are not much better furnished, are found an innumerable quantity of jars and boxes, either empty or in which the same article is repeated five times or more under different names. Thus, in Constantinople, I have seen in the shop of a Jew or Salonica, *vitriolated tartar* contained in seven vases, and under seven different but synonymous terms; and on my inquiry whether these were not the same substance, I was told that each salt possessed a particular curative virtue, and required a distinct mode of preparation.

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* A piastre is about 1*s.* 8*d.*

There are at Constantinople nearly 1200 *Pharmacies* of this description. About 300, resembling more or less those of Europe, are worthy of the name. The latter are in the districts of Galata, of Slavodronia, and in general in those parts of the town inhabited by Europeans. Even these establishments have their faults, and quackery triumphs. Few of these shops have what may be termed a laboratory ; as rarely have they warehouses or cellars. It is in the shop itself that all the medicinal substances are accumulated and prepared. The best arrangement observable in the Turkish shops is that the medicines are enclosed in glass cases ; by this means they are protected from the terrible dust which, in the summer months, pervades all the towns in the east. In addition, however, there are on stands or on the counter, large jars, containing coloured liquors of all tints, vessels in which serpents and other reptiles are preserved, and near the shop, jars of oil, retorts, Wolf's bottles, and other apparatus exposed to public view. Near the windows are placed large glass cylinders filled with blue vitriol, cut sarsaparilla, symlax, cinchona bark, crystals of tartaric acid, vases and stands on which are small caustic balls strung together like beads, bougies, syringes, &c.

All the chemical products are obtained from the great towns of Europe, and the compounds prepared are chiefly plasters and the most ordinary ointments. As neither a Pharmacopœia nor price lists exist in Turkey, each pharmacien prepares and sells his medicines as he thinks fit, and according to the greater or less percentage which he gives to the doctor who sends him prescriptions. This percentage ranges from twenty to fifty. From this, some idea may be formed of the precarious position of a Pharmacien who has not been able to obtain the patronage of a physician, and who depends upon the small profit he derives from retail business, or the preparation of a few prescriptions which are brought to him either by mistake, or by the particular favour of the patients. This abuse exists chiefly in Smyrna. There the Pharmacien would not venture to prepare any prescriptions but those emanating from the physician attached to his establishment, without exposing himself to great annoyance.

With regard to the personal qualifications of the Pharmacien, he is almost entirely destitute of scientific education. This glaring defect arises from the indifference of the Government, which does not oblige the pharmacien to obtain a diploma as an evidence of his qualification. Hence it is a common occurrence, that the assistants or employés of the physicians finish by establishing themselves as Pharmaciens. Among the numerous pharmaciens at Constantinople, scarcely ten or twelve can be found who have gone through any scientific study in a university.

Many years ago, the Government established at Constantinople a school of medicine, where young Turks received instruction from distinguished Physicians educated in France, Italy, or Germany. However, up to the present time, the results of this institution are no subject for congratulation, notwithstanding the great expense of its maintenance.

An abuse tolerated by authority, and which seriously injures the Pharmaciens, is the sale by merchants of every description of medicine, not only by wholesale, but even in single doses, and at a very low price, from which it follows that most of the Turks and Armenians in cases of small importance, never apply to a Physician, but always go to these Druggists for some simple remedy, such as senna, cassia, tamarinds, &c., of which the vendor himself makes a decoction if the patient desire it.

Among the medicinal substances also found in these bazaars, I may mention different conserves of roses, of cedar, of orange flowers mixed with strong aromatics, such as cloves, ginger, amber, and musk, which electuaries are considered by the Turks as universal panaceas; syrup of alkermes, Leroy's mixture, antisyphilitic syrup, sarsaparilla, sassafras, pistachios, almonds of the *pinus cembra*, nuts, opium, many narcotic tinctures, bad preparations of cannabis, &c., &c.

The weights used by the Turks are *okas* (2¼lbs.) and *drachms:* for measuring liquors in drops, grains of corn are used. The inaccuracy of this measurement is obvious, as some Pharmaciens for the sake of gain, purposely select the smallest grains possible. As Pharmaciens are not obliged to prepare their medicines by any dispensatory published by authority, each has his own process. It follows that the same medicine obtained at different shops, is entirely different in its medicinal properties.

This is an outline of the state of Pharmacy and Medicine in the principal towns of Turkey, and the further you advance into Asia Minor, the more does this merge into empiricism, and the practice of medicine is found in the hands of ignorant and grasping quacks, whose only desire is to obtain money and to sell for 200 or 300 piastres the most insignificant remedy, by making the credulous consumers believe that it is prepared with gold or precious stones. Sometimes, in the presence of the purchasers, to induce a belief in their statements, they throw gold and precious stones into a coloured and acidulated liquid, which is to form the desired remedy. A friend of mine quite worthy of belief, who resided several years in the interior of Asia Minor, assured me that he had seen a *Kombojanite* physician, who was instructed to prepare for a pacha a remedy for the jaundice, throw thirty ducats, a quantity of pearls and jewellery, in a red liquor to dissolve them. The liquor was evaporated, and a medicine was thus formed having an acid and bitter flavour, for which the pacha paid 500 piastres.—*Archiv der Pharmacie, and Journal de Pharmacie d'Anvers.*

THE ANONYMOUS CIRCULAR.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—Seeing in your last Journal a letter from Mr. John Beaton, giving his opinion upon an anonymous circular received by him, I beg to claim the same courtesy at your hands, and shall feel obliged by your inserting the following observations in your next number.

I am, Sir, your obedient servant,

16, *Cambridge Street, Oct.* 19, 1850. WM. DICKINSON.

With reference to the five questions asked in the circular, every Chemist and Druggist can say something in reply to them; and, with regard to the expediency of discussing the questions at the present time, I think it the best possible opportunity, knowing that the Council of the Pharmaceutical Society first undertook the consideration of the subject. That an Act of Parliament to regulate the practice of Pharmacy is a far more important subject I freely admit; and I am assured by a professional gentleman, who takes a very active interest in medical reform, that if the Chemists and Druggists had long since applied to Parliament for an Act to define and regulate their own body, that they would not have met with any opposition from the medical profession; but, on the contrary, they would have received their cordial assistance to remove one of the greatest stumbling-blocks to medical reform.

The Chemists and Druggists are indebted to any gentleman who render services gratuitously for their advancement and welfare, and more especially when of an efficient nature; but that the authorities of the Pharmaceutical Society have taken every available means to bring the claims of the Chemists and Druggists before Parliament I must most decidedly dissent from, whatever Mr. Beaton's belief to the contrary may be.

THE BENEVOLENT FUND.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

DEAR SIR,—In addressing you on the subject of the Benevolent Fund, I feel assured of your attention, and, I hope, more than the approval of our brethren who are connected with the Society. Such a fund, when fairly and deliberately considered, will be held as highly important, and its magnitude will not so much show the respectability of its supporters, as the amount of kindly and moral feeling which pervades the minds of the contributors. A large proportion of this sympathy must exist and be assiduously cultivated by us in order that we may assume and maintain a high stand among those sections of our countrymen which are distinguished for philanthropy and virtue. The question of why we should be in the rear of most other institutions, in this particular point, cannot be satisfactorily met. Among our brethren there is wealth, much intelligence, and fraternal feeling. It requires but the determination to do good and it is done. To support our argument we may suppose that the time of trial for the Benevolent Fund is not yet—many circumstances concur to prevent it, as the recent formation of the Society—the disinclination at so early a period of its history to present appeals—and especially the removal by death of so few of those who were with us when our excellent Institute was proposed and established. But a change must ensue, and the inquiry of "the founders—where are they?" will frequently be made. Widows of our brethren—children, perhaps orphans—will, in all probability, need that help which the present state of the fund could not allow, though cases the most necessitous were presented. It is, then, respectfully proposed that an effort be made to increase this prudent and essential portion of our finances, so that a confidence may be created in our body, mingled with much that is pleasant to our feelings, that no case of destitution would be unnoticed or unrelieved. We have, as far as I can ascertain, confidence in each other that a right application of our subscriptions will be made. How soon may the oscillations of trade, and of circumstances of a more serious character, place even many of us in that position in which a gratuity might avert a fearful consequence. A small annual donation on the part of the Members and Associates would soon realise enough to place the matter beyond a doubt, and the funds, as the fund of the Pharmaceutical Society, would elicit the most entire approval.

Remaining, dear Sir, yours, respectfully,

Collumpton, Oct. 17, 1850. JOSEPH FOSTER.

I beg to enclose a Post-office order for a small amount, payable to Mr. George W. Smith.

THE EPIDEMIOLOGICAL SOCIETY.

The Council of this Society met at the house of the President, on Friday, October 25. The draft of the laws was revised, approved, and ordered to be printed. It was decided that several special Committees should be appointed, as well as a Committee for general purposes. A general meeting of the Members will shortly be held, at which the President will deliver an address, comprising an outline of the objects, importance, and intended proceedings of the Society.

BOOKS RECEIVED.

INTRODUCTION TO CHEMICAL ANALYSIS (QUALITATIVE). By Dr. C. REMIGIUS FRESENIUS, Wiesbaden; with a Preface by Professor LIEBIG. Edited by J. LLOYD BULLOCK, F.C.S. 8vo, pp. 334. John Churchill.

A MANUAL OF QUALITATIVE ANALYSIS. By R. GALLOWAY, F.C.S. 8vo, pp. 118. John Churchill.

EPIDEMICS EXAMINED AND EXPLAINED; *or Living Germs proved by Analogy to be a Source of Disease.* By JOHN GROVE, M.R.C.S.E. London: James Ridgway, Piccadilly. 8vo, pp. 192.

THE ANATOMICAL REMEMBRANCER; *or complete Pocket Anatomist: containing a complete Account of the Bones, Ligaments, Muscles, &c. &c.* Fourth Edition. 12mo, pp., 249. S. HIGHLEY, Fleet Street.

PESTILENCE, ITS SOURCE AND SUPPRESSION. 8vo., pp. 28. Isle of Man: M. A. Quiggin, Douglas. London: Simkin, Marshall, & Co.

TO CORRESPONDENTS.

THE ADVERTISING SHEET.—In consequence of certain objections which had been raised against some of the Advertisements on the cover of this Journal, we have made strict inquiry of the Publisher (who manages that department) as to the manner in which the regulations are enforced. It has always been the rule to exclude quack medicines and secret nostrums. We find this rule has been generally observed, with the exception of James's Powder, which, being recognised by the profession, appeared to stand on rather different ground. There may have been a few Advertisements of a questionable character, although not exactly coming under the definition of quack nostrums; but in numerous cases insertion has been refused, and instructions have been given to adhere strictly to the spirit of the regulation, by refusing all Advertisements at all derogatory to the character of the profession.

Ejos.—(1.) There is a manifest distinction between the stringency of fining a person for merely selling an article, and fining him for assuming a name or title to which he has no right.—(2.) We have no personal acquaintance with the party alluded to or his history. Our correspondent does not state in what manner the oil is to be applied.

B. S. (Bristol)—The circumstance is much to be regretted, but we feel some delicacy in commenting upon it in the manner suggested.

T. M. O. wants a composition for effectually preventing "damp striking through walls." This term is frequently applied to damp which *rises* from the ground, or which is deposited on cold walls by *condensation* from a moist atmosphere. The mode of preventing the former evil consists in a layer of slate, set in cement on the foundation, just above the ground, the wall being built upon the slate, which forms a barrier between it and the damp ground. The latter evil (condensation) can only be prevented by keeping the wall as near as possible at the same temperature as the atmosphere.

T. P. (M.P.S., Bexley) wishes to know what will remove the stains of walnuts from the hands. We are unable to give a satisfactory answer to the question.

Zeta.—The label does not require a stamp.

M. P. S. (Knightsbridge).—A licence is required for retailing any kind of pepper.

U. Z.—Uric acid is obtainable from human urine only in small quantity. It is deposited, after the addition of hydrochloric acid, from the urine, either in its natural state or after concentration, according to the quantity originally present. This method is never practically adopted for obtaining uric acid, as it is found abundantly in the excrement of serpents.

C. J. R., M.P.S.—(1). Litmus paper is prepared by dipping slips of paper into an infusion or tincture of litmus and drying them. The blue paper is sometimes made more delicate by partly neutralizing the alkali of the litmus by adding a few drops of acid to it.—(2). The Thermometers may be had of Pastorelli, Cross Street, Hatton Garden.

Semper Fidelis.—Camphine is rectified oil of turpentine.

J. H. (Plymouth).—(1). Prepared cochineal, which is used for imparting a pink colour, is made by boiling ℥j each—cochineal, salt of tartar, cream of tartar, and alum, in ℥viij of water, and then straining.—(2). Apply a little heat to promote combination.

G. (Clifton)—*Dr. Fleming's Tincture of Aconite* is made as follows: Macerate ℥xvj of dried and powdered aconite root in f℥xvj of rectified spirit for four days, strain, then treat the mark by displacement, with as much more spirit as will make the whole quantity of tincture f℥xxiv.

Fidele. Blue Ink.—Add a solution of a per-salt of iron to solution of ferrocyanide of potassium, keeping the latter always in excess. Collect the blue precipitate thus formed on a filter, and wash it with water until it begins to dissolve in the water, which it will do when purified from the salts contained in the original mother-liquor. Rub it now in a mortar with distilled water, so as to form a solution of the required intensity of colour.

Hg Cl.—In examining compound extract of colocynth suspected to contain calomel, proceed as follows:—Treat it with water, which will dissolve the greater part of the extract, leaving the calomel, if present. Treat the insoluble residue with hot nitric acid or aqua regia, which will convert the calomel into a soluble per-salt of mercury, with which the charicteristic reactions may be obtained on adding caustic potash, ammonia, sulphuretted hydrogen, iodide of potassium, &c.

PATENT TIN-FOIL.—Chancery proceedings are in progress between Messrs. Betts and Co., patentees, and Mr. Robertson, who states that he is the sole licensee under the patent. Each party cautions the public to beware of the other. Tin-foil being much used by Chemists, it may be interesting to know the result, which we intend to report.

HOMŒOPATHY.—We have received several communications on this subject, and a pamphlet by Socius, which we are unable to notice this month on account of pressure of other matter.

We have also to acknowledge the receipt of numerous letters on a subject which, we think, it better not to enlarge upon at present.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Other Communications to the EDITOR (to the care of Mr. CHURCH

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. VIII.—DECEMBER 1st, 1850.

SELF-SUPPORTING DISPENSARIES.

The poor in this country obtain medical relief from a variety of sources.

All persons coming under the denomination of paupers are entitled by law to attendance and medicine from the parish medical officer.

Hospitals and dispensaries are established by private liberality for those, who, although not paupers, are suitable objects for this kind of charity.

Ascending in the scale, we have clubs and benefit societies, to which the recipients of medical relief contribute a portion of the funds, and receive, in case of illness, attendance, medicine, and, in some cases, a weekly allowance of money.

Many physicians and surgeons prescribe gratuitously at stated times for poor patients, and the services of medical men are frequently called into requisition, and cheerfully given without fee or reward to unfortunate sufferers who have no claim on any charity and have not the means of paying for advice. The liberality of the profession, in this respect, is exemplary and proverbial.

We have, therefore, a series of provisions for the medical treatment gratuitously, or nearly so, of persons of all grades, from the pauper upwards, whose circumstances do not enable them to obtain the same by purchase. All these privileges are in some instances abused, which is the case more or less with charities generally. We have even heard of patients leaving their carriages round the corner of the street, while they apply in *forma pauperis* for advice *gratis*. In every class of society there are some persons who put their pride in their pockets, and usurp advantages designed for those of an inferior grade. Others, on the contrary, are imbued with a spirit of independence which recoils at the idea of receiving charity in any form, and who suffer great privations on this account.

A system of self-supporting dispensaries has been tried in some provincial towns, and is now under discussion in the metropolis, having for its avowed object the removal of the objections and liability to abuse which belong more or less to existing medical charities.

According to the plan proposed, these dispensaries are to be supported by two funds. The Honorary Fund, consisting of the *subscriptions or benefactions of the benevolent*, which are applicable to the general purposes of the Institution; and the Ordinary Fund, consisting of the *free members' subscriptions of one penny and upwards weekly for each adult, and a halfpenny weekly for each child; or, where there are more than two children in a family, a stated sum, which compounds for all the children. The cost of the drugs and the remuneration of the medical officers are the only charges upon this fund, all other expenses being defrayed by the voluntary subscriptions of its patrons and friends.*"

The number of medical officers is unlimited—all medical men being invited to participate, and each patient is at liberty to select any medical adviser on the list.

The advantages said to be derivable from this plan are as follows:—It will encourage a feeling of independence in the poor who will pay for medical relief instead of receiving it for nothing: even paupers who now attend the parish doctor, might possibly be induced to avail themselves of the dispensaries, which would relieve the parish rates; existing hospitals and dispensaries, by adopting the system, might "extend four-fold their field of usefulness;" the medical officers, instead of performing their duties gratuitously, would receive remuneration; and the amount of remuneration would be increased by the mode of payment, which resembles that of a club or assurance association.

The plan is brought forward under the auspices of a society called the "LONDON SOCIETY *for promoting the establishment and facilitating the objects of self-supporting dispensaries throughout the United Kingdom and Ireland*," having a president, ten vice-presidents, and a council consisting of ninety-four medical men. The prospectus contains in addition, the names of four others, "who have expressed their approval of the principle of the society," and eight who have passed a vote of thanks to the projector, Mr. Smith. The prospectus is authenticated by the name of T. D. Hawker, secretary.

From the formidable array of medical names, it might be supposed that the plan has already undergone the scrutiny and received the approval of the profession. This is not the case. It has been brought forward by two or three individuals, who, by their plausible statements, have induced many medical men to entertain the question as one deserving of further inquiry.

It will be observed that this is not merely a proposition to establish a new charity on an improved plan. It is a chimerical project which, if carried out as proposed throughout the kingdom in every town, parish, and district, would bring about an entire revolution in medical practice. It would, if we are to believe the prospectus, increase "fourfold" the number of hospital and dispensary patients. It would also place the medical profession in the character of a joint-stock company of Apothecaries, trading on capital derived from "subscriptions and benefactions of the benevolent."

The project is in itself equivocal and contradictory. A self-supporting dispensary is not a charity. A dispensary, the "general purposes" of which are defrayed by "subscriptions and benefactions of the benevolent," is not self-supporting. The undertaking is in plain terms a speculation for the transmutation of metals. A copper currency not being professional, the dispensary is the crucible in which the copper is to be transmuted into gold.

In most speculations the recipients of the dividend stake their money in the venture. In this instance the benevolent pay the expenses, the medical officers take the receipts. The patients are led to believe that they are independent, while they are paying penny fees to the doctors and receiving medicine at less than prime cost, the expenses of rent, rates, secretary, dispenser, &c. &c., being defrayed from a charitable fund. It would be difficult to estimate the extent to which this description of charity might be abused. We are told that no abuse could take place, because no patient whose income exceeds a certain amount would be admitted. But the terms of subscription are "one penny *and upwards*," from which it appears that there is to be a sliding scale, opening the door to patients of higher grade.

That medical men ought to receive remuneration for services rendered to the poor is a proposition which no reasonable man will dispute. The parish lawyer, the parish parson, the surveyor, the builder, and all tradesmen who furnish labour or goods for paupers, receive a substantial return. Why should the medical man alone perform his services gratuitously? The question is easily answered. Let us take an example. The late Dr. Hooper was physician to the Marylebone Infirmary at a salary of £200 per annum. The directors and guardians of the poor were perfectly satisfied; the public made no complaint. But when the doctor retired, a competition arose, and two of the candidates, eager to outrun their rivals, betrayed the profession, and offered their services for nothing.* The Board of Guardians caught the idea, and issued a new advertisement for two *honorary* physicians, by which the parish saved the salary of £200 per annum.

In the Marylebone Dispensary, the Westminster General Dispensary, and other similar institutions, the medical officers formerly received salaries which have been suspended under circumstances similar to the above. When the candidates for these offices evince so much anxiety to work "for love," the committees of management could not in courtesy offer them money. This spontaneous liberality, on the part of candidates for medical appointments, has been the sole cause of the removal of the salaries, a step which otherwise would never have been contemplated. Even without a salary, an advantage is derived from temporary connexion with a hospital or dispensary. The accumulation of cases affords an opportunity for improvement, and the position serves as an introduction to private practice. When the desired object has been attained the office is vacated, and fresh aspirants appear in the field, all eager to work for nothing!

If the proposed self-supporting dispensary system were to become universal, this avenue to distinction would be to a great extent lost. The practice being distributed among an unlimited number, each individual instead of working a few years for fame and afterwards receiving gold, would continue to labour year after year for copper to the end of the chapter.

The expense of establishing a number of new dispensaries appears to be unnecessary, as the object might be more effectually and economically attained by each medical man having the following notice inscribed on his door:—"Patients attended at the rate of one penny "or upwards weekly for adults, one halfpenny or less for children; "medicine included.—*N.B.* Benefactions will be thankfully received "from the benevolent for the general purposes of the shop."

THE EXHIBITION OF THE WORKS OF INDUSTRY OF ALL NATIONS.

The apprehension which at one time prevailed that the demands for space would not be sufficient to fill the building, has now given place to an opposite anticipation. Towards the close of the period prescribed, the applications for space became overwhelming, and the total demand amounts to nearly double the area at disposal. A meeting of delegates of the local commissioners of the metropolitan districts was held on Wednesday, the 20th of November, when the following Resolutions were passed:—

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* The late Dr. Sims, who was afterwards elected, was not one of those who made this proposal.

I. That the local commissioners of the metropolis be divided into "Sectional committees," or committees of specialities.

II. That each sectional committee appoint a chairman and a deputy-chairman.

III. That to the said sectional committees be delegated the power of selection and rejection of articles, and the assignment of space to the several exhibitors in their specialty;—with an appeal, in case of dispute, to the whole of the chairmen of the sectional committees, assisted by the secretaries; any chairman in his absence being represented by the deputy-chairman of his sectional committee.

IV. That the proposal of the royal commissioners, to consider the metropolis as a "Unity," so far as regards the allotment of space to exhibitors, be approved; and that the distribution to the sectional committees of the space so allotted be assigned to the council of chairmen of appeal, to be elected by the sectional committees.

V. That power be given to the sectional committees to call in the assistance of any of the local commissioners of the kingdom.

VI. That the list of specialties be approved, subject to such changes as may appear to be expedient to a special sub-committee, to consist of Messrs. Liddiard, Crace, Betteridge, Sandlands, Glaisher, Morris, Graham, Ditchburn, James, Tite, Casey, Owens, and Bird, and that Professor Playfair be requested kindly to give his assistance.

VII. That the Rev. Mr. Cattley and Mr. Wire be appointed to receive the returns of space for the metropolis, from the royal commissioners, and to make the necessary arrangements for convening meetings of the local commissioners representing specialties, and for organizing the council of chairmen.

The following is a list of the special committees as finally settled:—

RAW MATERIALS.—1. Metallurgy and mineral products; 2. Chemical and pharmaceutical processes and products generally; 3. Vegetable and animal substances used for food, in manufactures, implements, or for ornament.

MACHINERY.—4. Machines for direct use; 5. Manufacturing machines and tools; 6. Mechanical, civil engineering, architectural, and building contrivances; 7. Military and naval engineering, structure, &c., armour, and accoutrements; 8. Agricultural and horticultural machines and implements; 9. Musical instruments; 10. Philosophical instruments and miscellaneous contrivances, including processes depending upon their use.

MANUFACTURES.—11. Cotton; 12. Woollen and worsted; 13. Silk and velvet; 14. Linen; 15. Mixed fabrics; 16. Leather, including saddlery and harness, skins, fur, and hair; 17. Paper, printing, and bookbinding; 18. Printing and dyeing of woven, spun, felted, and laid fabrics; 19. Tapestry, including carpets and floor-cloths, lace and embroidery, fancy and industrial works; 20. Articles of clothing for immediate, personal, or domestic use; 21. Carriages and their appurtenances; 22. Cutlery, edge-tools, and surgical instruments; 23. Wrought and hammered iron, cast iron, and iron castings; 24. General hardware; 25. Working in precious metals, jewellery, and all articles of luxury not included in the other juries; 26. Glass; 27. Ceramic manufacture, china, porcelain, earthenware, &c.; 28. Decoration furniture and upholstery, including paper hangings and papier maché; 29. Manufactures in mineral substances, used for building or decorations, as in marble, slate, porphyries, cements, artificial stones, &c.; 30. Miscellaneous manufactures, including manufactures from animal and vegetable substances, not being woven, felted, or laid, and small wares.

SCULPTURE.—31. Models and plastic art.

TRANSACTIONS

OF

THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, November 13, 1850.

MR. INCE, PRESIDENT, IN THE CHAIR.

The Meeting was very numerously attended by Members and Visitors, including among the latter many medical men who take an interest in the progress of the Society.

DONATIONS TO THE LIBRARY AND MUSEUM.

The following donations to the Library and Museum of the Society were announced:—

Medico-Chirurgical Transactions, vol. xxxiii., from the Royal Medical and Chirurgical Society.

Elements of Materia Medica, vol. ii., part 1, by Dr. Pereira, F.R.S.—From the Author.

Proteus; or the Law of Nature, by Dr. Radcliffe. From the Author.

Chuno Arrowroot, produce of Alstroemelia lictu, from Mr. Smith, of Conception, Chili, through Mr. Thomas Walford, Great Coram Street, Russell Square.

An original packet of Dr. James's powders, authenticated by the signature of Dr. James, from Mr. Hooper, Great Russell Street, Covent Garden.

The Souari, or Butter Nuts, in an original package, from Mr. Daniel Hanbury, Plough Court, Lombard Street. These nuts are the produce of Caryocar nuciferum, a magnificent lofty tree, native of tropical South America. The nuts, usually three in number, are contained in a large drupaceous fruit, sometimes six inches in diameter. The plant is figured in *Curtis's Botanical Magazine*, Tab. 2727, 2728.

POISONOUS PROPERTIES OF SULPHITE OF LEAD.

Mr. Greaves communicated the result of some experiments he had made by administering sulphite of lead to dogs. At a previous Meeting of the Society Mr. Redwood had shown that sulphite of lead is readily decomposed, and the lead rendered soluble, when exposed to the action of hydrochloric acid, and other agents, which it would be likely to encounter in passing through the intestinal canal; from which it was inferred, that this salt of lead, the presence of which had been proved in sugar made by Dr. Scoffern's process, could not, as represented, be perfectly innocuous. It still remained, however, to obtain direct evidence of the action of sulphite of lead on the animal system, and this was the object of Mr. Greaves's experiments.

Experiment No. 1.—*Effect of Internal Administration of Sulphite of Lead.*—To a young healthy dog was administered daily twenty grains of carefully prepared sulphite of lead in animal food, commencing on Tuesday, October 23rd. No apparent effect was produced until the seventh day, October 30th, when from all appearances he was labouring under a severe attack of colic, which continued for nearly two hours. No further symptoms were manifested until the tenth day, November 2nd, when another violent attack of colic came on, which continued for several hours. On the thirteenth day, November 5th, the appetite, which had hitherto been very good, began to fail, the food being taken with apparent suspicion.

On the fourteenth day, Nov. 6th, the animal took with great reluctance his last dose; at ten A.M. another fit came on, accompanied with great prostration of strength, and at intervals there was great stiffness of the limbs. The dog would not allow any one to approach him, apparently suffering from excruciating pain, and manifesting the symptoms of poisoning by lead, which continued until death terminated his sufferings at half past two, P.M.

The total quantity of sulphite of lead taken was 280 grains. At the commencement of the experiment the dog weighed 16lbs. 12oz.; at the conclusion, 13lbs. 8oz.: thus having lost 3¼lbs.

Upon examining the liver a considerable portion was found to be of a dark colour, and upon treating it in the usual method for the detection of lead, unmistakable evidence of its presence was obtained. The brain also gave similar indications, though in a less marked degree.

EXPERIMENT No. 2.—*Effect of internal and external action combined.*—To an old dog was administered daily twenty grains of carefully-prepared sulphite of lead in animal food; in addition to which there was rubbed into the skin of the abdomen (the hair having been shaved off) daily one drachm of an ointment composed of equal parts of sulphite of lead and lard. No evident symptoms appeared until the fifteenth day, when the dog refused to take any food; as also on the sixteenth day, when he appeared extremely sleepy and inactive: he would not take his usual dose. On the seventeenth day he took a little milk only, refusing to take the sulphite disguised in various ways: he was evidently ill. On the eighteenth day he was with difficulty induced to take a small quantity of food containing the sulphite. On the nineteenth he reluctantly took a small quantity of food with the usual dose of sulphite: from four to seven o'clock, P.M., on the same day he barked considerably, appeared more restless and lively than he had previously been for several days: at eleven o'clock, P.M., he was prostrate upon the floor in a senseless state, and foaming at the mouth; at intervals he with difficulty raised himself upright, but failed in attempting to walk. In this state he continued, alternately attempting to move about, and relapsing into a lethargic state, until his death, which occurred about five o'clock, A.M., on the twentieth day, November 11th.

On analysing the liver, indications of the presence of lead presented themselves.

This animal weighed, at the commencement of the experiment, 28lbs. 12oz.; at the conclusion, 21lbs., having lost 7¾lbs.

Dr. ALFRED S. TAYLOR said, it was very satisfactory to him to find that the conclusions which had been come to by himself and the other medical jurists appointed by the Government, were substantiated by the results which had just been communicated to the Meeting. He and his coadjutors were unanimous in the opinion that lead in all its forms was injurious to health when administered continuously, and they thought it a great fallacy to assume that those compounds which are insoluble in water are therefore innocuous. He had no doubt the subject of the use of salts of lead in the manufacture of sugar would shortly be brought under the notice of the Legislature, in which case he should feel justified in urging upon their notice the importance of the results of Mr. Greaves's experiments. It could not be doubted, after the experiments which had been made, that had Dr. Scoffern's process been allowed to be practised without interference, there would, ere long, have been hundreds of cases of lead colic throughout the country, resulting from the use of sugar containing sulphite of lead. He might state, with reference to the report of the medical jurists, that the opinions they had expressed were perfectly unbiassed, neither they nor the Government by whom they were engaged, having any other motive than that of protecting the public.

Mr. Bell stated, that he had received a letter from Mr. Brande, in reference to an observation made at the preceding Meeting, in which he was represented as having concurred with Dr. Gregory in designating sulphite of lead as *perfectly innocuous.* Mr. Brande said that he had not intended to convey such an impression by what he had stated in the communication referred to. — (See Pharmaceutical Journal for October, page 188.)

ON EXTRACT OF HEMLOCK.

BY MR. W. ARCHER.

In the following experiments upon the expressed juice and dried leaves of the hemlock plant (*Conium maculatum*) made in the laboratory of the Pharmaceutical Society, the results sought were,

1st, The means by which the expressed juice of the plant could be inspissated, so as to form a mass most nearly resembling, in chemical and medicinal properties, the freshly expressed juice.

2nd, Whether, by the separation of some of the constituents of the recently expressed juice, a more efficient extract than that usually met with could be obtained.

3d, Whether proof spirit, or rectified spirit, was the best menstruum for hemlock leaves.

The evaporating processes, whose comparative merits were tested, were, 1st, Exposure in shallow vessels to the open air in warm dry weather.

2nd, Exposure in shallow vessels to the influence of a *continuous current* of warm dry air. (In this instance an apparatus was employed precisely similar to that recommended in Mohr and Redwood's *Practical Pharmacy*, p. 78, fig. 72.)

3d, Exposure to the heat of an ordinary water-bath.

The result obtained by the first process is very satisfactory, so far as regards the quality and appearance of the extract obtained; but there is a great obstacle to the adoption of this process, especially on a large scale, viz., the uncertainty of the weather. It appears probable that no more efficient and generally applicable means of effecting the inspissation of hemlock juice, and other analogous fluids, will be met with than is afforded by the application of the *principle* of the hot-air closet before mentioned.

In the use of such an apparatus we have the following advantages:—

The evaporating liquid requires no stirring or other attention from the commencement until the conclusion of the process.

The temperature of the closet is perfectly at command, within a certain range; the evaporating liquid maintaining a temperature about 40° F. below the temperature of the air passing over it. For instance, we can easily obtain a current of air at 140° F. in the upper part of the apparatus, while the temperature of the liquid placed there does not exceed 100° F. The rate of evaporation is quicker than might have been expected, though perhaps not so expeditious as many would deem desirable; still it was found that the evaporation might be greatly accelerated if means were provided for forcing the current of heated air more quickly over the surface of the liquid by the use of a blowing apparatus, similar in construction to those employed at iron-foundries and smelting houses.

Evaporation by means of a water-bath is too well known to need any remark.

It was thought likely that the chlorophyle and albumen contained in the juice of hemlock might be removed with advantage, in the preparation of the extract, as these substances are generally believed to be inert.

When the expressed juice was heated to 110° Fahr., and allowed to cool, the whole of the chlorophyle subsided, while the albumen remained in the supernatant liquid in an uncoagulated state; for the purpose of obtaining these two apart from each other, the liquid containing the albumen was filtered from the chlorophyle, heated to 212 F. in order to separate the latter, and again filtered. This second filtrate was evaporated in the hot air apparatus before mentioned, the product was an extract of a brown colour, *perfectly* soluble in cold water; from the aqueous solution of this extract, alcohol precipitated a large amount of mucilaginous matter.

By washing with cold water, the peculiar odour of hemlock-juice could be entirely removed from both the chlorophyle and albumen, and as no smell of conia was evident on rubbing either of them with solution of potash, it would appear that the general opinion regarding the inertness of these two substances is correct. Caustic potash appears to be a very delicate test for conia; if any substance containing merely a trace of this alkaloid, be rubbed with liquor potassæ P.L., its presence is at once manifested by the development of its peculiar odour.

Some experiments were made with the view of ascertaining how far the officinal tinctures of hemlock might be regarded as uniform and efficient preparations.

Different specimens of hemlock leaves lost by drying from sixty-five to eighty per cent; it is evident, therefore, that equal weights of fresh leaves, obtained under different circumstances, will give very unequal results in the strength of preparations made according to formulæ in which a given weight of fresh leaves is ordered. Neither can the expressed juice be used with advantage where a given quantity is ordered, as its density varies considerably, depending in great on the state of dryness of the plant.

It would appear then, that by the use of dried leaves this source error may be avoided, and the uniformity of the preparation sufficiently secured, especially as these can be obtained in a pretty equable state of dryness, and with a very slight deterioration of their physical and chemical properties by the use of the hot-air apparatus before alluded to.

The experiments made seem to indicate that rectified spirit (sp. gr. 838 at 62° Fah.) is a more eligible menstruum for hemlock leaves than proof spirit (sp. gr. .920 at 62° Fah.), inasmuch as the mucilaginous and albuminous constituents of the leaves are quite insoluble in the stronger spirit, while conia, in the state in which it exists in the dried leaves is perfectly soluble in it.

A portion of hemlock leaves, dried in the manner mentioned, was percolated with spirit (sp. gr. .838 at 62° Fah.) until the liquid passed colourless. On treating the residue with water, and evaporating the liquid, an extract was obtained, which gave no smell of conia when rubbed with potash, and had the characteristics of an inert mucilage. A portion of the tincture obtained as above was allowed to evaporate spontaneously, the residue was very small in proportion to the quantity of the tincture employed, and could scarcely be said to possess the characters of an extract, inasmuch as it consisted of a yellow oily-looking semi-fluid substance of very disagreeable odour, mixed with a small quantity of chlorophyle. Another portion of the same tincture was distilled with a strong aqueous solution of potash; the distillate, which evolved the odour of conia strongly, was mixed with a little water and left at rest; after a few hours, a thin oily-looking film, having an alkaline reaction, appeared on the surface.

It has been before mentioned that the object of these experiments was to ascertain the best means of preparing the Pharmacopœia extract of hemlock, the means by which the *most efficient* extract could be obtained, and whether proof spirit or rectified spirit was the best menstruum for hemlock leaves,

It is thought that the following answers may be deduced from the account of the experiments made:—

1st, That the best means of inspissating hemlock juice is to subject it, placed in shallow vessels, to the influence of a continuous current of warm dry air.

2nd, That an extract, possessing greater activity in equal doses than that generally met with in commerce, may be obtained by removing the albumen and chlorophyle from the expressed juice before evaporating it. Were this mode adopted there would not be the same inducement as there now is to give a factitious green colour to extract of hemlock.

3rd, That as dried hemlock leaves were, to all appearance, deprived of their activity by rectified spirit, and that as the resulting tincture held few of the constituents of the dried leaves in solution, besides conia, and a little chlorophyle, a strong spirit of specific gravity .838, or thereabout, is better adapted for making an effective tincture of hemlock than a weaker spirit is.

As regards the part of the plant to be used, it will, it is thought, be found more advantageous to use the leaves alone than any other part,

no more aves containing a less amount of water,
spissa f solid matter, than an equal weight of
wit part of the plant.
d juice is also much influenced by the
om the leaves being of a much brighter
other part of the plant.

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that it was very desirable to collect as
g to the preparation of different extracts,
greater uniformity in these preparations,
for at present ject to considerable variation.

Mr. **Waugh** coincided with the Chairman, and thought the mode of treating the subject adopted by the author was worthy of imitation.

Mr. **Davenport** referred to the separation of the chlorophyle and albumen in the preparation of extract of hemlock. He said he could fully confirm the statement of the author that the extract thus made was perfectly soluble in water. It must, also, be much stronger than that in which those constituents were retained, as he had sometimes found them to amount to as much as fifty per cent. of the whole. There was, however, one objection to this kind of extract, that it was very deliquescent, so that it was with great difficulty that it could be used for making pills.

Mr. **Squire** observed, that the process given in the new Dublin Pharmacopœia, for the preparation of extract of hemlock, was somewhat similar to that referred to by Mr. Archer in his paper, the chlorophyle and albumen, which separated on coagulation, being rejected from the extract. In the Dublin process, however, the chlorophyle which subsided on allowing the expressed juice to stand before heating it, is mixed in during the process of evaporation. He said that when the season is favourable, and the proportions of the proximate principles normal, the juice evaporated spontaneously, or by a water-bath, keeps perfectly good for years, but when the extract is made in bad seasons, it is liable to become mouldy. He had recently tried an experiment, which consisted in adding a little gum to the extract last alluded to, which prevented its moulding.

LOBELINA, A VOLATILE ORGANIC BASE, FROM LOBELIA INFLATA.

BY MR. WILLIAM BASTICK.

Indian tobacco has been examined by several distinguished authorities on Materia Medica, evidently with a view to eliminate its active principle. Dr. Pereira mentions in his work, that Dr. Calhoun has announced the existence of a peculiar principle of this plant, but on referring to the original paper published in the *Journal of the Philadelphia College of Pharmacy*,* it will be at once seen that Dr. Calhoun merely obtained an acidified extract of the plant, which was clearly a mixture of several bodies.

Dr. Pereira's own experiments go far to render the existence of such a principle probable, although he does not appear to have pursued his research far enough to have separated it.

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* Vol. v., p. 300.

The most recent and complete chemical examination of lobelia inflata, is that by Reinsch,[*] published in 1843. He found a peculiar substance, which he termed Lobelin, and which he supposed to be the active principle. He admits it was not obtained in a state of purity. It had an acid reaction, and was not soluble in ether. Its various behaviour with tests shows that it was a compound of organic acids, probably with a base.

I undertook the chemical investigation of the lobelia plant, with the object of endeavouring to clear up these discrepancies, and if possible, to isolate its active principle. What the result has been the following details will explain:—

After several preliminary experiments to ascertain the nature of the active principle, I came to the conclusion that it was a volatile organic base. I adopted with perfect success this process for its extraction:

Macerate two pounds of the herb in a gallon of alcohol, to which previously has been added three ounces of sulphuric acid, for forty-eight hours. Drain the alcoholic solution from the herb, and filter. Mix with it powdered caustic lime with continued agitation, until the fluid has an alkaline reaction. Again filter, and saturate the filtrate with sulphuric acid in slight excess. After having filtered this acid solution, evaporate with a gentle heat until it is reduced to about one-fourth. To the residue add a little water, and again evaporate until all traces of the alcohol have disappeared. Filter to remove the resin which has been precipitated by the water. Then carefully saturate the filtrate with a concentrated solution of carbonate of potash, and if a precipitate ensues, the liquid must be again filtered. Mix the filtrate with a considerable excess of carbonate of potash. Treat the liquid with successive portions of ether by constant agitation, until it no longer dissolves anything thereout. By evaporating the ethereal solution spontaneously, the organic base, Lobelina, remains. It is now nearly pure, except containing colouring matter, of which it may be deprived by dissolving it in alcohol, and agitating the solution with purified animal charcoal until decolourized, again filtering and evaporating until it no longer loses weight. This last operation is best conducted in the vacuum of an air-pump over sulphuric acid. The above process is similar to that recommended by Liebig for obtaining hyoscyamine.

Lobelina, as might be inferred, resembles hyoscyamine in many of its properties, with this marked difference, that it is crystallizable, and lobelina is not. It is only an oily viscid transparent fluid, with a strong alkaline reaction, especially in a state of solution. It smells slightly of the plant in a pure state, but mixed with ammonia it gives out strongly the odour of the herb. It tastes pungent and tobacco-like, and when taken internally in minute doses it exercises on the human frame all the marked and disagreeable consequences of a large dose of the plant. It is, therefore, doubtless, a virulent poison.

Lobelina is volatile, but it does not evaporate entirely unchanged. It dissolves in water, and with facility in alcohol and ether. Caustic alkalies decompose it readily. For these reasons it cannot be procured from the plant by the ordinary methods of obtaining the non-volatile alkaloids. By reason of its destructibility by caustic alkalies, it cannot be separated by distillation as conia or nicotina. It is evidently the only active ingredient of the lobelia inflata; for when that substance is treated with caustic potash and submitted to distillation, nothing passes into the receiver but a resin-like body, and ammonia, resulting, doubtless, from the decomposition of the lobelina, and the contents of the retort are without any marked characteristics.

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[*] Vide Pharmaceutical Journal, vol. iii., p. 128.

With acids lobelina thoroughly performs the part of a strong base, by neutralizing them. It is precipitated from its solution by infusion of nutgalls in the form of white flocks. It is also thrown down by ammonia, but not permanently from a concentrated aqueous solution of its salts. All its combinations with mineral acids are soluble in water and alcohol. When its salts are thoroughly decolourized by animal charcoal they are crystallizable. The hydrochlorate of lobelina forms colourless, transparent, acicular, well-defined crystals. In this respect lobelina differs from nicotina and also from conia.

Mr. Waugh inquired whether Mr. Bastick considered that the alkaloid he had described was uncrystallizable, or that he had not yet obtained it in a state of sufficient purity for it to assume that state.

Mr. Bastick said he considered lobelina to be uncrystallizable, like conia and nicotina.

PLANT YIELDING THE AFRICAN ARROW-ROOT.

Mr. Bentley exhibited a plant which had been grown from one of the rhizomes sent over with the African arrow-root, a specimen of which was exhibited at the preceding Meeting of the Society. It had been cultivated in the Gardens of the Royal Botanical Society, in the Regent's Park, and proved to be Maranta arundinacea. He took the opportunity of inviting the Members and others who might receive, with foreign specimens of drugs, any seeds or roots that would admit of vegetation, to send them to the Society, and he would superintend their cultivation in the Botanic Gardens. Much useful information might thus be obtained.

ON THE NEW DUBLIN PHARMACOPŒIA.

BY MR. SQUIRE.

Five years ago, when addressing this Society on the subject of a National Pharmacopœia, I expressed a hope that, by the year 1851, the Colleges of Physicians would have adopted one uniform set of formulæ for the preparation of medicines, to be used in all parts of Great Britain and Ireland, which was favourably responded to by many, but, unfortunately, has not been fulfilled. The new Pharmacopœia of the London College is, I believe, prepared, but is not yet published, and that of the Edinburgh College still bears the date of 1841. The Dublin Pharmacopœia is that alone of which the new edition has appeared, a period of twenty-four years having elapsed since the publication of its predecessor. I am sorry to find, however, that this work does not contribute much towards the realization of the object I have already alluded to, namely, the establishment of uniformity in the formulæ of the three Pharmacopœias, preparatory to the adoption of a National Pharmacopœia.

Some of our Members having thought it desirable that the principal features of novelty in the newly-published work should be brought under discussion at these meetings, I have undertaken to introduce the subject by a few general observations, in which I will endeavour to show,

1st, That the changes made by the Irish College tend, in some instances, to promote uniformity in the three Pharmacopœias;

2dly, That in several instances the discrepancies previously existing have been increased by the alterations made; and

3dly, That some of the formulæ, although not agreeing with those of either of the other Pharmacopœias, appear to have strong claims for adoption.

The Irish College have followed the example of that of Edinburgh, in discarding the Latin language and substituting English throughout the entire work, with the exception of the names of the preparations and of the articles of the Materia Medica. Indeed, I may observe here, that in the changes they have made, they have more frequently assimilated the work to that of the Edinburgh than of the London College. Thus we find, in reference to weights, the Edinburgh College has stated, in the two last editions of its Pharmacopœia, that it "has never been able to see the force of those objections which prevented the introduction of the imperial system of weights into the practice of medicine and pharmacy, on the occasion of the late reform in the national weights and measures." The Edinburgh College, however, although appearing to lean in that direction, have not yet adopted the imperial or avoirdupois weights. The Irish College, on the other hand, have not only advocated a change, but adopted it. Nay, they have done more, they have given a new value to the avoirdupois drachm, and have created a scruple, which did not previously exist in this denomination of weights. This innovation appears to me to be objectionable and quite unnecessary, for I think it would have been more convenient and less likely to lead to error, had all quantities under an ounce been expressed in grains. At present, we have no means, in this country, of correctly representing the Irish drachms and scruples, in dispensing, without having new weights made, which would be objectionable on account of the additional complication it would introduce into our systems of weights. Indeed, it is much to be regretted that one uniform system of weights has not been agreed upon by all Europe, an object which Earl Fitzwilliam appears to have contemplated in suggesting that a prize should be given for the best essay on this subject at the Great Exhibition of 1851.

The following are the principal cases in which either new formulæ have been introduced, or alterations have been made in those previously inserted, obviously with the view of promoting uniformity with the London or Edinburgh Pharmacopœia.

Name of Preparation.	*London.*	*Edinburgh.*	*Dublin, New.*	*Dublin, Old.*
ACIDUM ACETICUM GLACIALE	Not inserted	By decomposing dry acetate of lead with oil of vitriol, sp. gr. 1.068	By decomposing dry acetate of lead with muriatic acid gas, sp. gr. 1.065.	Not inserted
ACIDUM BENZOICUM	By subliming Benzoin	Same as London	Same as London	By boiling Benzoin with lime, precipitating with muriatic acid, and then subliming
ACIDUM SULPHURICUM PURUM	Not inserted	By adding sugar, and heating nearly to the boiling point, or by distilling	By distilling, sp. gr. 1.846	Not inserted
ACIDUM SULPHURICUM DILUTUM	Acid f ℥iss. Water f ℥xivss.	f ℥j. f ℥xiij.	f ℥j. f ℥xiij.	2 parts 14 parts
ACIDUM SULPHURICUM AROMATICUM	Not inserted	Sulph. Acid, f ℥iiiss. Rect. Spirit, Oiss. Cinnamon, ʒiss. Ginger, ℥j.	f ℥iiiss. Oiss. ℥iss. ℥j.	Not inserted
MAGNESIÆ CARBONAS	Precipitated from the sulphate with carbonate of soda	Same as London	Same as London	Precipitated from the sulphate with carbonate of potash
LIQUOR BARII CHLORIDI	Chlor. Bar., ʒj. Water, f ℥j.	Same as London	ʒj. f ℥j.	1 part 3 parts
DECOCTUM PAPAVERIS	Poppy Capsules, ℥iv. Water, Oiv. Boil for ¼-hour.	℥iv. Oiij. ¼-hour.	℥iv. Oiij. 10 minutes.	℥iv. Oij. Boil for ¼-hour.
EXTRACTUM RHEI	Rhubarb, ℥xv. Proof Spirit, Oj. Water, Oviij.	℔j. Ov.	℔j. Ov.	℔j. Oj. Ovij.

Name of Preparation.	*London.*	*Edinburgh.*	*Dublin, New.*	*Dublin, Old.*
OXYMEL	Honey, ℔j. Acetic Acid, ℥iij.	Not inserted	℔j. ℥iij.	Honey, ℔j. Distilled Vinegar, ℥viij
INFUSUM CHIRETTÆ	Not inserted	Chiretta, ʒiv. Water, Oj. Infuse for 2 hours.	ʒiv, ℥xix. Infuse for 1 hour.	Not inserted
LINIMENTUM CAMPHORÆ	Camphor, ℥j. Olive Oil, f ℥iv.	Same as London	℥j. f ℥iv	℥ss. ℥iv.
LINIMENTUM SAPONIS	Soap, ℥iij. Camphor, ℥j. Sp. Rosemary, f ℥xvj.	℥ij. ℥j. f ℥xvj.	℥ij. ℥j. f ℥xvj.	Same as London
MISTURA AMMONIACI	Ammoniacum, ʒv. Water, Oj.	Not inserted	ʒiv. Oj.	Ammoniacum, ʒj. Pennyroyal wat., f ℥viij
MISTURA AMYGDALÆ	Sweet Almonds Sugar Gum Arabic Water	Same as London	Same as London	Sweet almonds Bitter almonds Sugar Water
LIQUOR POTASSÆ	Carb. Potash, ℥xv. Lime, ℥viij. Water, Cong. j. sp. gr. 1,063.	℥xvj. ℥viij. Cong., j. Oj. sp. gr. 1.072.	℥xvj. ℥x. Cong., j. ℥vij. Sp. gr. 1.068	℥xxj. ℥xxj. Cong. j. Sp. gr. 1080
ZINCI OXYDUM	By calcining the carbonate	Same as London	Same as London	By burning zinc
PILULÆ HYDRAGRI	Mercury, ʒij. Conf. Roses, ʒiij. Powd. Liquorice, ʒj.	Same as London	Same as London	Mercury, ʒij. Conf. Roses, ʒiij. Extract of liquor., ʒj.
PULVIS RHEI COMPOSITUS	Not inserted	Magnesia, ℥xij. Ginger, ℥ij. Rhubarb, ℥iv.	Same as Edinburgh	Not inserted
ALCOHOL	Spirit containing 8 per cent. of water	Absolute alcohol	Same as Edinburgh	Spirit containing 6 per cent. of water

In some of the foregoing cases, the accordance of the new Dublin processes with those of the other Pharmacopœias is not so close as the formulæ at first view, would appear to indicate, in consequence of the dissimilarity in the weights; the ounce, drachm, and scruple, of the Dublin Pharmacopœia being nearly one-tenth less than those of the English and Scotch Pharmacopœias.

The following are some of the most striking cases which I have selected, in illustration of the statement, that in several instances the discrepancies previously existing have been increased by the alterations which have been made :—

Name of Preparation.	*London.*	*Edinburgh.*	*Dublin, New.*	*Dublin, Old.*
Liquor Plumbi Subacetatis Compositus	Sol. Diacet. Lead, f ʒjss	Not inserted	℥ss.	ʒj¼.
	Proof Spirit, f ʒij		℥ss.	ʒj¼.
	Water, ℥xx		℥xx.	℥xx.
Liquor Calcii Chloridi	Fused Chloride, ℥iv.	Cryst. Chlor., ℥viij.	Fused Chloride, ℥iij.	Dry Chloride, ℥iv
	Water, f ℥xij.	Water, f ℥xij.	Water, ℥xij.	Water, ℥xiv.
Confectio Piperis Nigri	Black Pepper, ℔j.	℔j.	℔j.	Same as London
	Elecampane, ℔j.			
	Liquorice	℔j.	℔j.	
	Fennel, ℔iij.	℔iij.		
	Honey, ℔ij.	℔ij.	℔ij.	
	Sugar, ℔ij.	℔ij.	℔ij.	
			Oil of Fennel, f ℥ij.	
Decoctum Aloes Compositum	ʒiv. of Aloes to ℥xvj. of the Decoction.	ʒj. of Aloes to ℥xvj. of Decoction	ʒiss. of Aloes to ℥xvj. of Decoction	Same strength as London
Infusum Aurantii Compositum	Orange Peel, ℥ss.	Same as London	ʒvj.	ʒiv.
	Lemon Peel, ʒij.			ʒij.
	Cloves, ʒj.		ʒj.	ʒj.
	Water, ℥xx.		℥xx.	℥xvij.
Infusum Calumbæ	Calumba, ʒv.	ʒiv.	ʒvj. ℈j.	ʒv.
	Boiling Water, ℥xx.	Cold Water, ℥xx.	Cold Water, ℥xx.	Boiling Water, ℥xx.
Infusum Cinchonæ	Pale Bark, ℥ j.	Bark, ℥j.	Pale Bark, ℥ij.	℥j.
	Boiling Water, ℥xx.	℥xx.	℥xx.	Cold water, ℥xij.

Name of Preparation.	*London.*	*Edinburgh*	*Dublin, New.*	*Dublin, Old.*
INFUSUM PAREIRA	Pareira, ʒvj. Water, ℥xx.	Same as London.	ʒviij. ℥xviij.	Not inserted
INFUSUM QUASSIÆ	Quassia, ℈ij. Water, ℥xx.	ʒj. ℥xx.	ʒij. ℥xvij.	℈ij. ℥xviij.
INFUSUM ROSÆ...........................	Rose Petals, ʒiij. Dil. Sulph. Acid, f ʒiss. Sugar, ʒvj. Water, ℥xx.	Same as London	ʒiv. ʒij. ℥xx.	ʒj. ℈ij. ♏ 72 ʒv. ℈j. ℥xx.
LINIMENTUM AMMONIÆ	Liq. Ammon., ℥j. Olive Oil, ℥ij.	Same as London	℥j. ℥iij.	℥j. ℥viij.
LINIMENTUM CAMPHORÆ COMPOSITUM	Camphor, ℥iiss. Liq. Ammon., f ℥viiss. Sp. Lavender, f ℥xx.	Not inserted	℥iiss. ℥v. ℥xv.	Same as London
HYDRARGYRUM c. CRETA	Mercury, ℥iij. Chalk, ℥v.	Same as London	℥iij. ℥vj.	℥iij. ℥iss.
PULVIS CRETÆ COMPOSITUS...............	Chalk, ℥vj. Cinnamon, ℥iv. Tormentil, ℥iij. Acacia, ℥iij. Long Pepper, ℥ss. Nutmeg.	℥vj. ʒij. ℥j. ℈j.	℥v. ℥iiss. ℥ij. ℥ss.	Same as London.
PULVIS JALAPÆ COMPOSITUS	Jalap, ℥iij. Cream Tartar, ℥vj. Ginger, ʒij.	℥iij. ℥vj.	℥iij. ℥v. ʒij. ʒvj.	Same as Edinburgh.

I have now in conclusion to adduce a few instances to show that some of the changes, although not producing uniformity with either of the other Pharmacopœias, appear to have strong claims for adoption. This, I think, is the case with the diluted mineral acids, which all contain, in a given volume, the same *equivalent* quantity of each absolute acid. This was one of the changes I recommended five years ago. A similar uniformity has also been established in the liquid preparations of opium, all of which now have the same strength in equal measures. It is much to be desired that this method of equalizing the strength of preparations of the same class was introduced more generally, as it would greatly aid the medical man in apportioning the doses. I may also mention the simplification of the formulæ for the ointments, in most of which ointment of wax is now made the menstruum or adjuvant, as a change in the right direction, although this cannot probably be said of some of the attempts at simplification, of which there is evidence in other parts of the work.

277, *Oxford Street.*

The discussion on this paper was adjourned to the next meeting.

THE LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, October 30th, 1850.

MR. SHAW, VICE-PRESIDENT, IN THE CHAIR.

THE Council met the Students in the laboratory, and Mr. Hamilton conducted an examination of his pupils in that portion of the course they had gone through during the session. No previous intimation of the examination had been given to the students, and their answers were deserving of much credit. The Council expressed the highest satisfaction at the progress they had made, and the number and neatness of the specimens prepared by them; and intimated that, at the close of the ensuing session, prizes would be presented to the most meritorious students.

The monthly Pharmaceutical Meeting was held on the 15th Nov. The President in the chair.

Mr. **HAMILTON** gave a short sketch of the plan pursued by him in the laboratory for carrying out the course laid down by the Council, and exhibited the specimens prepared by several of the pupils, and also a numerous collection of the ores of the metals.

Mr. J. B. **EDWARDS** resumed his notice of the new Dublin Pharmacopœia, pointing out the changes which had been made in the various formulæ, and exhibiting samples of many of the new and improved preparations. He regretted the frequency of changes, which appeared to be attended with no adequate objects, and noticed many of an important nature that were dangerous, in the absence of any definite notice of the strength of the preparation, and strongly urged the importance of the union of the three formularies in one, and the propriety of a representation, on the part of the Chemists and Druggists, to the legislature, calling its attention to the importance of the subject.

BIRKENHEAD CHEMICAL & PHILOSOPHICAL SOCIETY.

[This institution originated with the Chemists and Druggists of Birkenhead, and is designed to promote the same objects which are contemplated in the Pharmaceutical Associations at Liverpool and other places. The constitution and arrangements of these provincial societies are regulated to suit the capabilities and requirements of each locality. In the present instance it has been considered advisable to extend the society to those who are not Chemists and Druggists, giving it rather a popular character; and, although in this respect it differs from the associations previously formed, we trust the experiment will be found successful and conducive to the promotion of science.—Ed.]

The first *conversazioné* of the Members of this Society and their friends took place on the 29th of October last, T. B. Blackburne, Esq., in the chair. The attendance was most excellent, comprising a good proportion of the *savans* of Liverpool, in addition to the respectable professional talent of the town. A large number of ladies further graced the meeting with their presence, and took the warmest interest in the proceedings. In short, never since the formation of the town has any meeting of the kind been so highly and numerously attended; and the arrangements gave the most complete satisfaction to all. Mr. Warry, the president, gave a brief sketch of the history and objects of the Society, which had now for nine months been rapidly increasing in numbers and in the means for intellectual enjoyment, and being actuated by feelings of liberality, the society was desirous of sharing its advantages with its friends, and therefore had determined to hold conversaziońés from time to time. The entertainment consisted of short illustrated lectures on various branches of science and philosophy, relieved during the intervals by music, under the management of members of the Philharmonic Society of the town. During the evening an hour was allotted for refreshments, and the inspection of a very unique collection of specimens. A splendid set of five microscopes, provided by Drs. Inman and Higgins, may be especially mentioned, and a magnificent set of diagrams of fossil animals, supplied through the kindness of Professor Ansted.

The lectures were as follows, viz., on Botany (T. C. Archer, Esq.) Electricity and Galvanism (J. B. Edwardes, F.C.S.) Fossil Animals (T. C. Archer, Esq., in the place of J. Price, M.A., absent from illness). On the Sense of Smelling and the various uses of the Nose (Dr. Higgins). Chemistry (W. Johnson); and Philosophy of Science (Rev. S. H. Booth, M.A.)

ORIGINAL AND EXTRACTED ARTICLES.

ON THE MYROSPERMUM OF SONSONATE,
FROM WHICH BALSAM OF PERU, WHITE BALSAM, AND BALSAMITO ARE OBTAINED.

BY JONATHAN PEREIRA, M.D., F.R.S.

In the last number of the Pharmaceutical Journal I stated, that I had received from Sonsonate a species of Myrospermum, from which Balsam of Peru, White Balsam, and Balsamito are obtained. I then believed the plant to be identical with that figured by Lambert, and which according to both Kunth and De Candolle is *M. pubescens.* A careful examination of the specimens in the British Museum, from which Lambert's figures were drawn, has led me to doubt the identity of his plant either with the Sonsonate species or with the *pubescens* of Kunth and De Candolle. For the present, therefore, I shall designate the plant which I have received the "*Myrospermum of Sonsonate.*"

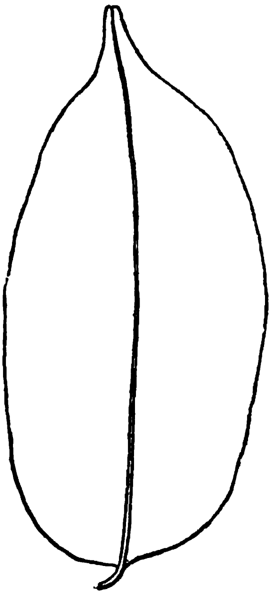
The specimens of the *Myrospermum of Sonsonate,* which I have received, consist of branches, leaves, and fruits. The flowers I have not met with.

The *branches* are terete, warty, but otherwise smooth, ash-coloured, or ash-brown.

The *leaves* are alternate, petiolate, and impari-pinnate. The common petioles appear to the naked eye devoid of hairs, but when examined by the microscope are found to be covered with a few short hairs.

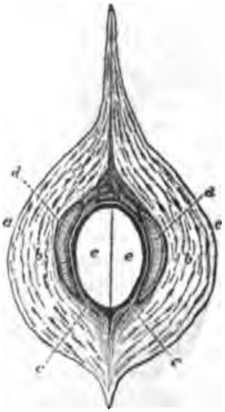
The *leaflets* are from 5 to 11, alternate, with short petioles. Exclusive of footstalk, their length varies from about 2 to 3½ inches; and their width, at their widest part, from 1 to 1½ inch. The most usual size is 3 inches in length, and 1¼ to 1$\frac{4}{10}$ inches wide. Their general shape is oblong or oval-oblong, in some cases ovate. They are rounded or very slightly tapering, not cordiform, at the base. Superiorly they contract abruptly into an emarginate point. To the naked eye the partial petioles and midribs appear devoid of hairs; but when examined by the microscope short lymphatic hairs, having a glossy or resinous appearance are distinctly visible on them; and the partial petioles appear somewhat rough from transverse rugæ. The leaflets are elegantly marked by rounded and linear pellucid spots; the lines being usually parallel with, or in the direction of, the primary veins. To see the spots the leaflet must be held up against a strong light and examined by a magnifier.

The *fruit* is a one-celled, one-seeded, winged, indehiscent pod (called by some a samara, by others a samaroid legume). The fruit-stalk is naked at the base, but is amply winged superiorly. The fruit,



Outline of a leaflet of the Myrospermum of Sonsonate.
(Natural size.)

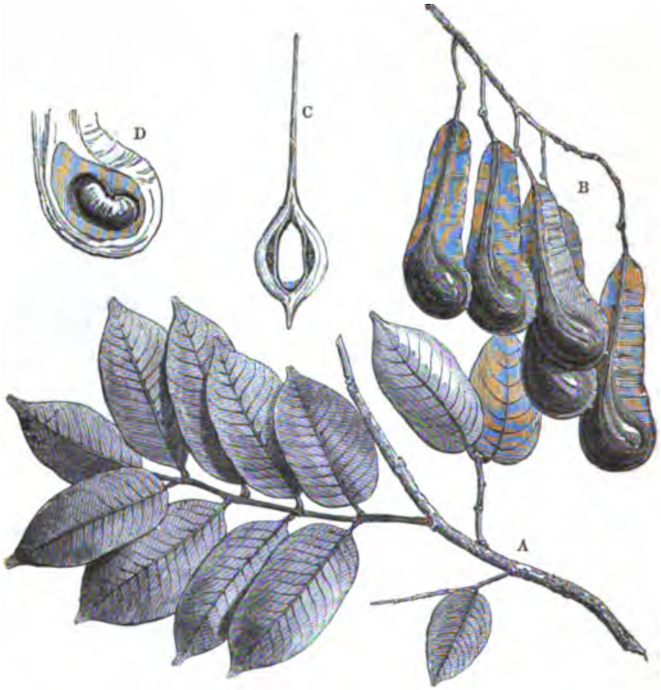
including the winged foot-stalk, varies in length from about 2 to 4 inches; the usual length is 3⅛ or 3¼ inches. At the peduncular extremity the fruit (or rather its winged footstalk) is rounded, or very slightly tapering, unequal-sided; at the summit it is enlarged, tumid, and rounded, with a small point (the remains of the style) at the side. The mesocarp is fibrous; but immediately exterior to the endocarp it contains in receptacles a yellow oleo-resinous or balsamic juice, which, by age, hardens and resinifies. Ruiz, Kunth, Endlicher, and De Candolle, describe this juice as immediately surrounding the seed, and being between the seed and the lining (endocarp) of the shell: but this is a mistake, it is exterior to the endocarp. The principal part of the balsam resides in two receptacles or vittæ, one placed on either side; but if a transverse section of the fruit be examined by the microscope, numerous receptacles of the more or less dried balsam are perceived in all parts of the mesocarp. In the two larger receptacles the balsam is usually found in the liquid state; but sometimes the walls of the receptacles are lined with the crystallized balsam (Myroxocarpine). That the balsam resides in the mesocarp and not in the cavity of the fruit is proved by the cross section, which shows that the paries of the cavity of the fruit is continuous with the two sutures. The seed lies loose and dry in the cell of the pericarp; and is covered by a thin, white, membranous coat (testa?) The cotyledons are yellowish and oily, and have an agreeable odour like that of the tonka-bean or melilot, and a bitter taste somewhat resembling that of the bitter almond. By digesting the seeds in ether a tincture is obtained, which yields on evaporation a very agreeable smelling amber-coloured soft extract, whose odour resembles that of the tonka-bean or melilot.



Cross section of the fruit and seed. (Magnified.)

a a Epicarp
b b Mesocarp.
c c Endocarp.
d d Large vittæ or lacunæ containing balsam.
e e Cotyledons.

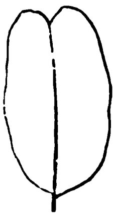
Some of the fruits which I gave to Mr. Alfred Smee were sown by him in a pot, and placed in his hot-house. Several of them have produced thriving plants. A leaf of one of the plants thus raised consists of 5 alternate leaflets marked with pellucid dots and lines. To the naked eye all parts of the leaves appear quite smooth; but when examined by the microscope the general and partial petioles, the mid-ribs, and the edges of the leaflets, are seen to be covered with small, reddish, appressed, lymphatic hairs. The lamina of the leaflet is emarginate, but the summit of the mid-rib, crowned by a small bush of hairs, projects, on the dorsal surface, beyond the lamina, and gives the appearance of a minute pointlet or mucro. As the leaflets dry this pointlet appears to be shrinking and becoming brown. As the leaf grows it probably falls off.



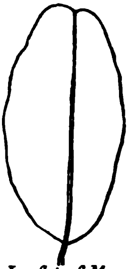
The Myrospermum of Sonsonate. (About one-third the natural size.)
A Leaf-bearing branch.
B Fruit-bearing branch.
C Vertical section of the fruit.
D. Lateral section of the fruit, showing the seed *in situ*.
From specimens in my possession, received from the Balsam Coast by Mr. Skinner.

1. The *Myrospermum of Sonsonate* is probably identical with the *Hoitziloxitl*, or *Indian balsam tree* of Hernandez; and the *balsam tree* mentioned by Don Juarros and Lieut. Baily.

2. From both *Myrospermum frutescens*, and *M. pedicellatum*, the myrospermum of Sonsonate, is distinguished by the size and shape of the leaflets, as well as by the fruit.

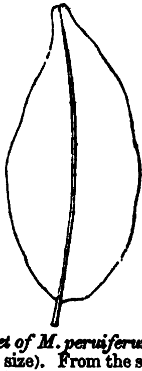


Leaflets of M. frutescens (nat. size).



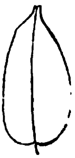
Leaflet of M. pedicellatum (nat. size).

3. The leaflets of *M. peruiferum* (Linn.), sent by Mutis to the younger Linnæus, are smaller than those of the plant which I have received from Sonsonate. In shape they are not very essentially different, but are rather more oval-lanceolate than oblong. The general and partial petioles, the midribs, and the edges of the leaflets, are covered by a pubescence. In this respect they agree with the corresponding parts of the young plants of the Sonsonate myrospermum raised by Mr. Smee. The leaflets are also marked by pellucid rounded and linear spots.


Leaflet of M. peruiferum, Linn. (Nat. size). From the specimen in the Herbarium of the Linnæan Society.

The leaflets of *M. peruiferum* in Kunth's Herbarium are rather larger, and more ovate than those in the Linnæan Herbarium; and they are often a little cordate at the base.

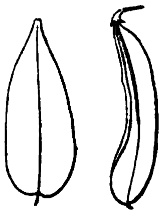
The *Myrospermum* No. 4787, collected by Mr. Weddell in Bolivia, is considered by M. Guibourt to be identical with the *M. peruiferum* of Kunth, though the leaflets are generally smaller.


Leaflet of *M. peruiferum*, Kunth (one-third the natural size).

The *Myrospermum* No. 3613, also collected by Mr. Weddell in Bolivia, and at the foot of which he found a balsamic substance having the odour of balsam of Tolu, and called by M. Guibourt *dry balsam of Peru*, is probably only a variety of Kunth's *M. peruiferum*. Its leaflets are marked with numerous pellucid dots and lines.

4. The *M. pubescens* of Kunth and De Candolle has the branches and petioles hairy. It differs from *M. peruiferum*, Kunth, in its leaflets being narrower, more oblong, and more rarely cordiform at the base, and by the nerves and petioles being all closely covered with red hair.

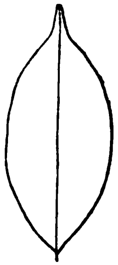
Kunth and De Candolle regard this species (*M. pubescens*) as identical with the plant figured by Lambert as *Myroxylon peruiferum* of Linnæus. But the branches, petioles, and leaflets of the latter are quite smooth, and by this character, as well as by the larger size of the fruit, they are distinguished from *Myrospermum pubescens* of Kunth and De Candolle.


Leaflet and pod of *M. pubescens*, Kunth. (One-third the natural size.) This and the preceding figure are from sketches sent to me by M. Guibourt.

The plant which Ruiz (*Quinologia*) has described under the name of *Quinquino*, and which he says is the *Myroxylon peruiferum* of the *Flora Peruviana*, as well as of the younger Linnæus, is probably *M. pubescens* of Kunth; for he describes the common petioles, and the under surface of the leaves, as being hairy.

5. The leaflets of *M. toluiferum* are never cordate at the base; but, on the contrary, are sometimes tapering. Towards their summit they suddenly contract and terminate by a narrow and elongated point, which scarcely presents any indications of emargination, and indeed sometimes presents not an indication of it.

6. The plant to which undoubtedly the *Myrospermum* of Sonsonate most closely approximates is that which has been figured by Lambert as the *Myroxylon peruiferum* of Linnæus.



Leaflet of *M. toluiferum*, Kunth, collected at Jaen de Bracamoros (one-third the natural size). From a sketch sent by M. Guibourt.

On referring to Pavon's specimens (now in the British Museum), from which Lambert's drawing was made, I find that they are marked in Pavon's own handwriting "*Myroxylon balsamiferum.*"

The plant which Ruiz described in his memoir (contained in his *Quinologia*) under the name *Myroxylon peruiferum*, appears to be a distinct plant from Pavon's *M. balsamiferum*. Lambert has, therefore, translated Ruiz's memoir, describing one species of *Myrospermum*, and has added to it a plate representing another species! That the description and plate do not apply to the same species seems evident from the following facts:—

α. Ruiz says that the plant which he describes is called, in the unpublished portion of the *Flora Peruviana* (the joint work of himself and Pavon) *Myroxylon peruiferum:* while the plant from which Lambert's figure is taken is named, in the hand-writing of Pavon (one of the authors of the *Fl. Peruv.*) *M. balsamiferum.*

β. Ruiz states that the common petioles and under surface of the leaflets, are hairy; but those of *M. balsamiferum* are quite smooth.

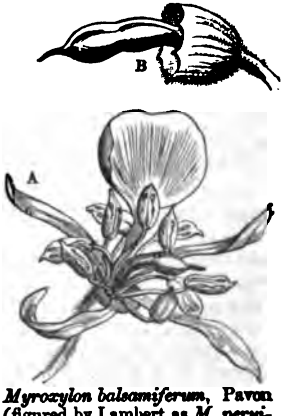
γ. Ruiz describes the leaflets as being ovato-lanceolate; whereas those figured by Lambert are oval-lanceolate.

δ. Ruiz describes the pericarp as being nearly two inches in length; whereas Lambert has figured pericarps, which are from four-and-a-half to nearly six inches long.

The *Myrospermum of Sonsonate* so closely agrees in general with Pavon's *M. balsamiferum*, that I was at first led to believe the two plants to be identical; and I was the more inclined to this opinion from the circumstance that, in one of the communications which I have received from Sonsonate, the Myrospermum from that place was called "*Myroxylon balsamiferum.*"

Lambert's figure appears to have been made up from different specimens in Pavon's collection, and not from any one exclusively. Unfortunately there is reason to suspect that the leaves of at least two species are contained in the collection under the same name, for in some of them the pellucid spots are exclusively round, in others round and linear.

The principal points in which *M. balsamiferum* differs from the *Myrospermum of Sonsonate*, are the following:—



Myroxylon balsamiferum, Pavon (figured by Lambert as *M. peruiferum*, Linn.)
A. Flower magnified.
B. The curved ovary, surrounded at the base by the calyx.

1. *The size and shape of the leaves.*—Many of the leaves of Pavon's specimens, those which agree best with Lambert's figure, are larger than those of the Sonsonate plant.

The shape also is different. While, in the Sonsonate plant the prevailing shape is the oblong, that of Pavon's plant is more oval. Again, the leaves of the Sonsonate plant are more generally rounded at the base and less tapering at the summit than those of Pavon's specimen.

When specimens of the two plants are placed side by side, the prevailing difference observed, is the larger size, and more tapering summits of the *M. balsamiferum.*

2. *The size and shape of the fruit.*—The pods of Pavon's plant are longer than those of the Sonsonate plant. The average length of the latter rarely exceeds three inches or three-and-a-quarter inches, while those of Pavon's plant vary from four to six inches.

In the shape of the fruits there is also a difference. In Pavon's plant the fruit is nearly of equal width throughout, the two margins of the wings being parallel, or nearly so, throughout the greater part of the length of the pod. Thus many of the pods are of the same width (about 1¼-inch) for more than four inches of their length. In the Sonsonate specimens, on the other hand, the margins of the fruit diverge from each other in the direction from the peduncle towards the summit, and in no two parts has the pod the same width.

Central America is the country of the Myrospermum of Sonsonate. It grows on the Balsam Coast (between 13° and 14° N. lat., and 89° and 90° W. long.) in the State of Salvador, where the black and white balsam are exclusively obtained from it. Hernandez mentions Panuco as one of the places where it grows; and Clavigero* states that it "is common in the provinces of Panuco and Chiapan."

Various medicinal products are obtained from this tree. "By making an incision in the trunk of it, a liquor exudes called the *black balsam*, an admirable remedy for effecting the speedy cure of wounds of every description: from the flowers the *spirit of balsam* is made: the seeds or nut produce the *oil of balsam*, an excellent anodyne; and the capsules yield the *white balsam.* From these simple kinds the *tincture* or *essence of balsam* is extracted: it is generally termed *balsamito*, and was a discovery of Don Jose Eustaquio de Leon, director of the mint in Guatemala, who published a description of the many virtues of this peculiar medicine †."

The only medicinal products of the tree with which I am acquainted are, *black balsam* (commonly called balsam of Peru), *white balsam*, and *balsamito.*

1. THE SONSONATE OR ST. SALVADOR BLACK BALSAM.

THIS is the *Balsam of Peru* (*Balsamum Peruvianum*, Ph. Lond.) of commerce. At Sonsonate it is termed *Black Balsam* (*Balsamo negro*). It is sometimes denominated the *Black* or *Liquid Balsam of Peru.*

Sonsonate or St. Salvador black balsam of commerce (balsam of Peru of the shops) is exclusively the produce of the Balsam Coast, which extends from the Acajutla to the Port Libertad, on the Pacific side of Central America.

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* *Storio Antica del Messico*, tomo i., p. 63. 1780. (Also the English translation by Cullen, vol. i., p. 32. 1787.)

† *A Statistical and Commercial History of the Kingdom of Guatemala in Spanish America.* By Don Domingo Juarros. Translated by J. Baily, Lieut. R.M. Lond. 1828, p. 261.

It is obtained by the native Indians, who make incisions into the bark of the trees, burn the outside slightly, and insert woollen or cotton rags into the apertures to absorb the juice which exudes. When these are saturated they are removed, and others introduced in their place. The rags are then boiled in water in large jars, by which the balsam is detached, and, rising to the surface, is skimmed off and put into calabashes or bladders for sale. In this state the Indians bring it into Sonsonate. The merchants who purchase let it stand in barrels that the dirty water may separate, and afterwards strain it through a sieve to separate any pieces of rags, or other foreign bodies, which may be present. Usually a little pure water is added, and the balsam is put into jars for exportation at Acajutla. Sometimes it comes direct to Europe, at other times indirectly by Lima, Valparaiso or other parts of the Pacific, or by Belize or Honduras on the Atlantic side of Central America. The average production is about 25,000 lbs. per annum.

Mr. Wazsewiez tells me that the natives obtain this balsam from three species of *Myrospermum*, which he calls *M. punctatum*, *M. pubescens*, and *M. myrtifolium*, all of which he says grow on that coast, and are not distinguished by the natives.

2. THE SONSONATE OR ST. SALVADOR WHITE BALSAM.

This substance is called, at Sonsonate, *White Balsam* (*Balsamo blanco*). It is, I suspect, often confounded with the balsam of Tolu, for Mr. Klée, of Guatemala, by whom my sample was sent, says that he sends the white balsam as a sample of balsam of Tolu. Its properties, however, are entirely different to those of balsam of Tolu, which Ruiz calls white balsam.

White balsam is obtained at Sonsonate by pressure, without heat, from the interior of the fruit and seed. Mr. Wazsewiez, who, when in Central America, had assisted in procuring white balsam, described and showed me the method of preparing the fruit for the expression of the balsam. It consists in removing the wings, the epicarp, and the fibrous or woody portion of the mesocarp. All these parts are readily separated by the fingers. The nucleus of the fruit, called at Sonsonate the *pepita* or seed, consisting of the internal portion of the mesocarp, the endocarp, and the seed, is then submitted to pressure.

The expressed product, which is called white balsam, probably consists of two distinct classes of substances, viz., the *oleo-resinous matter* contained in the pericarp, and the *fatty* and other constituents of the seed.

White balsam, as I received it, was imported in globular earthen jars, surrounded by a kind of wove or plaited matting, and closed by an earthenware stopper. The jar enclosed in the matting, is about a foot high (to the top of the stopper) and ten-and-a-half inches in diameter, and it contains about twenty pounds of balsam, which has partially concreted or crystallized on the sides of the jar.

When removed from the jar and put into a white glass bottle, it closely re-

Jar, enclosed by matting, containing the white balsam.

sembles in appearance strained American or Bordeaux turpentine. It is semifluid, or a soft solid; and by exposure becomes firmer. It is somewhat granular, apparently from intermixed resinous crystals. By standing, it partially separates into a white and more opaque crystalline resinous deposit, and a superior, more translucent, thinner, and more fluid portion. It is quite devoid of the fragrant cinnamic or vanilla odour of the balsams of Peru and Tolu. Its odour is not disagreeable, and is compounded of the peculiar smell of the balsamic matter of the pericarp, and of the melilot-like odour of the seed. One person who smelled it declared that it resembled the odour of cubebs.

It is only partially soluble in alcohol, but more so in ether. By digesting it in rectified spirit, three products are obtained: 1. A white, tough, soft solid, which remains at the bottom of the vessel. 2. An oleaginous yellow liquid which rests on the preceding; and 3, the spirituous solution which floats on No. 2. By digestion in ether, a portion of the balsam remains undissolved. The ethereal tincture, by evaporation, yields a kind of fatty or resinous product.

3. BALSAMITO.

Esencia Tinturado del Balsamo Virgen; Essence or Tincture of Virgin Balsam.—This is a tincture of the fruit, and is made by digesting the fruit (deprived of its wings) in rum. The sample which Mr. Skinner kindly gave me, is a clear liquid, having the colour of sherry wine, and the odour like that of the melilot (*Melilotus officinalis*) or of the tonka-bean, and a very bitter taste. When mixed with water, it forms a milky liquid.

This preparation, which is in high repute in Central America, was invented by Don José de Leon, Domiciliary Presbyter of the Archbishop of Mexico, and the director and founder of the Royal Mint of Guatemala. Its virtues (real or imaginary) are set forth at great length in a Spanish handbill (now before me) printed in Central America. An abstract of these is given in Lieut. Baily's translation of Juarros's *History of Guatemala*, before referred to. According to these authorities, balsamito is a stimulant, cordial, corroborant, anthelmintic, and diuretic. It is administered in the dose of a drachm in fainting fits, dyspepsia, flatulent colic, the cold stage of fever, hysteria, worms, &c. It is employed also to facilitate labour and the expulsion of the placenta, to check vomiting and diarrhœa, to relieve spasm, &c. In surgery it is extensively used as a vulnerary, as an application to sloughing sores, and to relieve the itching, heat, and pain which remain after the removal of a chigoe (*Pulex penetrans*). Mixed with water it forms a milky fluid, which is used as a face-wash to remove freckles, and as a lotion for ulcers.

Mr. Skinner speaks in the highest terms of the beneficial results which he has himself witnessed from the application of *balsamito* to sloughing and other wounds, and he tells me it is in high repute in Central America as a vulnerary; a portion of this, which he kindly gave to me, I have placed in the hands of my friend and colleague, Mr. Luke, for trial in sloughing wounds. Mr. Luke tells me that he has applied it in one case only, to a sloughing wound. It caused so much pain, that it became necessary to suspend its application. The slough, however, speedily separated.

I subjoin two extracts, one from a private letter to Mr. Skinner from his partner, Mr. Klée—the other from Lieut. Baily's work on *Central America*, just published. They are in part my authorities for some of the preceding statements.

APPENDIX.

1. *Extract of a letter to G. U. Skinner, Esq., from Charles Rudolph Klée, Esq., Prussian Consul-General for Central America.*

"The tree which produces the *Balsamo negro*, or *Balsamo de Peru*, in this country, grows only in a small district in the state of San Salvador, near the town of Sonsonate, called "the Balsam Coast;" and although a very hot climate it is a hilly country, but a very rich soil. It is only populated by pure Indians, who possess the secret of extracting the said balsamo de Peru, which they bring for sale to Sonsonate, put in gourds or bladders. In this way they used to ship it formerly, but the Indians bring it often mixed with rags and water; and now the merchants in Sonsonate let it stand some time in barrels and clean it, and then pack it in jars, in which package it is generally shipped now. Any other sort of oily matter does not mix with the balsam, and the dirty water gets soon to the bottom, after which it is strained; although it appears very thick it passes through a very thin sieve. Generally a little pure water is put into the jars: they say it prevents fermentation. From all the accounts that I could learn from the people in Sonsonate, and from the very Indians who sold the balsam, and which I believe to be true, it appears, that in certain seasons, they make incisions in the bark of the tree, burn the outside slightly, and then bind woollen or cotton rags round it, in which the balsam is caught up; the rags are afterwards boiled in large jars with water, and the rags fall to the ground. There is *no* other place on the whole Pacific side where this balsam is made but on this Balsam Coast. All the balsamo negro which comes to the European markets, by way of Lima, Guayaquil, Valparaiso and Belize, Honduras, or Stó. Tomas de Guatemala, is the produce of our balsam coast. The whole production of it does not amount to more than 20,000 lbs. or 30,000 lbs. per year—the average may be 25,000 lbs. The merchants in Lima and Valparaiso buy it with much pleasure, and pay good prices to the Sonsonate merchants.

"The Canonigo Dhiguero, when he was proprietor of Ispanguasate, planted the balsam tree there, and I found about fifty fine large trees. The tree itself is a very fine tall and handsome one, with a straight, round, and high stem; the bark smooth, ashy coloured, and not very thick. The branches extend at the top, and the leaf is of a dark glossy green, rather a little curled. On a tree which was near the Campana, I tried the experiment to get the balsam out, but did not succeed; and one of the mozos told me that it was not the right time. The tree grows as high as any of your oak-trees, and as thick. In April, 1846, I purchased two jars of *Balsamo blanco* of a gentleman from Sonsonate, as a sample of *Balsamo de Tolu;* these I send you as well as the kernels of which it is made. By the mode they manufacture it, it can never be made an article of trade; and, unless you send us an apparatus and instruction how to extract it, which I think might be done in the way that heavy oils are extracted, such as oil of cloves, &c., provided it is worth while, no use can be made of it.

"The *Esencia tinturada del Balsamo Virgen*, is what we call here *Balsamito.* Finding by experience, that it would be a fine drug, curing old wounds, perfuming, washing, &c., &c., I got from Don José Soto the way to prepare it, and the sample which I remit to you by the Honduras and Pacific side is pretty large, and of fine quality.*

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* It is now in the West India Docks.—*J. P.*

"As I have told you already, this balsamito is made by infusing the nut of the balsam tree, macerating the shell and kernel in brandy* of thirty degrees. Its inventor was José de Leon, Esq., as you will see by the printed paper enclosed. However, the shell of the nut, which is like that of an almond, contains in its concavities a most aromatic oil, and more so than that of the kernel itself. Brandy can never extract all this oil. Perhaps Dr. Pereira would be kind enough to put you in the way to learn the mode how to extract the balsam, after he has seen the nut, &c.

"In answer to Dr. Pereira's questions:

"1st, I remit you a box with ten bottles of balsamo negro, or balsamo de Peru, made at the balsam coast, and remitted to me by Mr. Victor Lenouvel, of Sonsonate, and which is the produce of the bark of the balsam tree, called by M. de Wazsewiez, *Myroxylon peruiferum*, as he told me. He has seen it at Ispanguasate, and at the Balsam Coast. This balsam is extracted as first described.

"By looking at it you will soon find that it is the identical balsam of commerce, of which we have remitted some large lots in former times, and of which you will get a considerable lot next year.

"No. 1. A piece of stem and bark, will be remitted shortly.

"No. 2. The way to extract the balsam I have mentioned, but all I may further learn about it will be reported.

"Nos. 3 and 4. Branches with fruit and flowers will be remitted.

"I shall order Saravia to send a few Arobas of seed, &c. &c. from Sonsonate, and another similar parcel I shall send José M. Tun for to Ispanguasate. It strikes me that the tree is just now in fruit. The small parcel which I remit now of pepitas is the same which I bought in 1846, the almond without the shell, of which the white balsam is made. It is a scarce article of trade. I had never seen it before, nor does any of it appear in trade, here or in Sonsonate.

"The balsam tree grows on sundry other places on the Pacific side of Central America; but no notice is taken of it, nor is any balsam produced. Near Chiquimulilla and on the Coast of Suchiltepeques there are trees of it.

"The first essay of making balsamito you will find in the box with the balsamo: one bottle with balsamito distilled in *bain marie;* one bottle with balsamito made in the common way by infusion; one bag with the almond goes alone."

2. *Extract from Mr. Baily's Work, entitled "Central America; describing each of the States of Guatemala, Honduras, Salvador, Nicaragua, and Costa Rica; their Natural Features, Products, Population, and reasonable capacity for Colonization."* 8vo, 1850. Saunders, 6, Charing Cross.

"That part of the coast extending from Acajutla to Libertad, is emphatically termed the "Balsam Coast," because there only is collected the article known in commerce as the Balsam of Peru; the particular district is intermediate to the two ports, and is not large, as it does not reach either of them within three or four leagues. Lying to the seaward of a low lateral ridge of mountains, the whole tract, excepting a few parts on the borders of the ocean, is so much broken up by spurs and branches thrown off from the main eminence, and so thickly covered by forest as to be nearly impassable to a traveller on horseback; from this cause, it is so rarely visited, that very few residents, either of Sonsonate or Salvador, have ever entered it. Within this space are situated some five or six villages, inhabited solely by Indians, who are so jealous of their possessions, that they will not suffer any of a different race to live among them. They cultivate so little ground for maize, frixoles, plantains, and other necessaries for subsistence, besides a very small quantity of cocoa, that they are not unfrequently forced to purchase these articles from adjoining parts. They have their own municipalities and chief men, governing themselves pretty much as they please, being, in fact, almost independent of every other authority. In some of the villages there is a church, but in no one a resident curate, who, when his ministry is deemed indispensable on festivals or other occasions, is attentively conveyed by them to and from Guayacoma or Ateas, to which curacies they nominally are dependent. Strictly speaking, they hold no other intercourse with other towns than what is necessary for carrying on their peculiar traffic.

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* The liquid here and in other places called "brandy," is in fact, "rum," being obtained by fermentation from sugar.—*J. P.*

"They support themselves by the produce of the balsam trees and cutting cedar timber, of which they furnish large quantities in plank and scantling to Sonsonate and San Salvador for building purposes and carpentering, with occasionally some pieces of more valuable wood, fit for cabinet work. Their chief wealth is the balsam, of which they take to market from fifteen to twenty thousand lbs. weight annually, yielding from four thousand seven hundred, to six thousand three hundred dollars. It is sold in small portions at a time in the before-mentioned towns to persons who purchase for exportation. The trees yielding this commodity are very numerous on this privileged spot, and apparently limited to it, for on other parts of the coast, apparently identical in soil and climate, rarely an individual of the same species is here and there met with.

"The balsam is extracted by making an incision in the tree, whence it gradually exudes and is absorbed by pieces of cotton rags, inserted for the purpose. These, when thoroughly saturated, are replaced by others, which, as they are removed, are thrown into boiling water. The heat detaches it from the cotton, and the valuable liquor being of less gravity than the water, floats on the top, is skimmed off, and put in calabashes for sale. The wood of the tree is of close grain, handsomely veined, nearly of a mahogany colour, but redder; it retains for a long time an agreeable fragrant odour, and takes a fine polish. It would be excellent for cabinet makers, but is seldom to be obtained, as the trees are never felled, until by age or accidental decay all their precious sap is exhausted. This balsam was long erroneously supposed to be a production of Southern America, for, in the early period of Spanish dominion, and by the commercial regulations then existing relative to the fruits of this coast, it was usually sent by the merchants here to Callao, and being then transmitted to Spain, it there received the name of Balsam of Peru, being deemed indigenous to that region. The real place of its origin was known only to a few mercantile men."—(Pp. 93, 94.)

ON MYROXOCARPINE.

A NEW CRYSTALLINE SUBSTANCE FROM WHITE BALSAM.

BY JOHN STENHOUSE, LL.D., F.R.S.

A FEW months ago I received a quantity of a fragrant semifluid balsam from my friend Dr. Pereira, which had been sent to him from Guatemala, under the name of *white balsam*.

This balsam is said to be obtained from the fruits of the same tree which yields the ordinary balsam of Peru.

The white balsam is quite neutral to test paper, and has a peculiar agreeable smell, pretty closely resembling that of melilot. On digesting the balsam in spirit of wine of ordinary strength, a considerable portion of it readily dissolved, and on the clear liquid remaining at rest for twelve hours, a quantity of large white crystals were gradually deposited. These crystals, which retained a good deal of adhering resinous matter, were obtained perfectly pure when they had been digested with a little animal charcoal, and repeatedly crystallized out of hot spirits. When pure the crystals have no smell, and form broad thin prisms rather more than an inch in length. They are colourless, and possess considerable lustre, approaching that of nitrate of silver. They are hard and brittle; insoluble in both hot and cold water, but readily dissolve in hot alcohol and ether. They are also soluble to some extent in cold alcohol and ether. When chewed they have no taste. Their solution is quite neutral to test paper. I have given this crystalline substance the name of *myroxocarpine*, in the belief that it is derived from the fruits of the Myrospermum as previously mentioned. It was subjected to analysis with oxide of copper in the usual way.

I. 0.2907 substance dried *in vacuo* gave 0.821 carbonic acid and 0.247 H O
II. 0.215 ditto gave 0.6085 carbonic acid and 0.185 water.

Calculated numbers:			I.	II.
48 C	3600	77.63	77.02	77.18
35 H	437.5	9.43	9.46	9.55
6 O	600.0	12.94	13.52	13.27
	4637.5	100.00	100.00	100.00

The empirical formula for myroxocarpine is therefore
48 C 35 H 6 O.

Myroxocarpine, when dried *in vacuo*, and then heated to 100° C., loses no weight. It melts at 115° C., and forms a transparent glass, which does not crystallize on cooling. It re-crystallizes, however, when it has been dissolved in hot spirit of wine. When myroxocarpine is heated considerably above its melting point, a very small portion of it sublimes, but by far the greater part of it undergoes decomposition, being changed into an uncrystallizable resin, with the formation of much acetic acid.

Myroxocarpine is characterized by extreme chemical indifference. It displays no affinity for either acids or alkalies, none of which at all increase its solubility. A quantity of it remained unchanged after having been boiled for several hours with a strong solution of potash. It is also but difficultly attacked by acids. Strong nitric acid, when assisted by heat, slowly converted it into oxalic acid and an uncrystallizable resin, but without the formation of carbazotic, or any similar acid. Chlorine also acts upon it very slowly. A current of chlorine gas sent for several days through a quantity of myroxocarpine in a finely divided state, and diffused through water, slowly converted it into an uncrystallizable resin, which contained variable quantities of chlorine. The chlorine, however, was retained by a very feeble affinity, for when the resin, which had been washed with water till it was quite natural, was dissolved in hot spirits, its solution, on standing for a short time, became strongly acid. Bromine produced a very similar result.

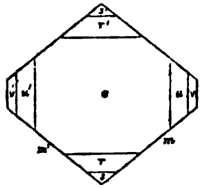
I regard myroxocarpine, therefore, as a very indifferent crystallizable resin, which in some respects, especially in the readiness with which it crystallizes, closely resembles santonine, but exhibiting much feebler chemical affinities than even that compound. The white balsam is very rich in myroxocarpine, a pound of the balsam yielding about one ounce of the principle.

Through the kindness of Professor W. H. Miller, of Cambridge, to whom I have been often indebted for similar favours, I am enabled to subjoin the accompanying figure and measurements of the angles of myroxocarpine.

PRISMATIC. Symbols of the simple forms :
c 001, *r* 011, *s* 012, *u* 101, *v* 201, *m* 110.
Angles between normals to the faces :

m c	90° 0
m m'	77 48
r c	52 56
s c	69 19
u c	46 53
v c	64 55

No cleavage observable.



ON THE VARIETIES OF LINT.

(*Continued from page* 243.)

As stated in our last number, several specimens of lint have been submitted for trial, and we are indebted for the following report to

JAMES LUKE, ESQ.

Senior Surgeon of the London Hospital.

I HAVE examined and tested the various specimens of lint which you were kind enough to send to me, and, in compliance with your request, to state my opinion of their comparative excellence, I beg to say that, considering the qualities which good lint should possess, of a smooth and soft surface, the flue not easily separable from the fabric, the fabric itself having closeness of texture and substance, with a capability of being torn without fraying the adjoining part, I think the specimen marked "BEST LINT, OLD KIND,"[*] has these qualities in the highest degree, and is that to which I should be disposed to give the preference. Some of the pieces, however, are irregular on the edge, which will induce some waste in use. From its possessing the above-mentioned qualities, it appears to me best suited for the spreading of ointment, the application of lotions, and the formation of compresses, these being the more common purposes to which lint is applied.

The specimen marked "TAYLOR'S PATENT LINT," I think is next to be preferred, and its qualities approach very closely to those of the "old kind." It has a good surface and fabric, and tears well. The edges are even, and its width convenient, and probably there would be less waste in use.

"TAYLOR'S SUPERIOR FLAX LINT" is also a good lint, and possesses sufficiency of substance and regularity of fracture. It, however, possesses the defect, in a slight degree, of the flue being too readily detachable from the fabric, and on that account is not so well adapted for the spreading of ointment as the specimens before-mentioned.

"WACKERBATH AND ROSS'S SUPERIOR GOLDEN FLAX LINT" has the same defect of flue being too readily detachable from the fabric, but in a higher degree than the preceding. It is frayed also by tearing.

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[*] Manufactured by Mr. Oyler, 2, York Street, Camden Town.

" Tipton's patent Lint" has the flue still more loosely connected with the fabric, so that it is easily raised when ointment of any consistence is spread upon it. It is only four and a half inches in width; and although it tears more readily than any of the above specimens, it does so in the direction of its length, which appears to me to be inconvenient.

" Toswill's patent Lint"* is a thready material—the threads running longitudinally, but are connected by a very few transverse filaments. It is very easily torn in the long direction, but is at the same time frayed. The flue is very readily detachable from the threads, and the fabric is thin and without sufficiency of substance.

Not knowing the comparative cost of the above kinds of lint, I have of course not made cost a matter of consideration, but have endeavoured to place them the position in which they should occupy, according to their respective merits as regards quality.

39, *Broad Street Buildings, Nov.* 12, 1850.

We subjoin a letter from Mr. Tustin, on the same subject, which was deferred in anticipation of the above, that both communications might appear together.

London Hospital, Oct. 17.

Sir,—Owing to the great consumption of lint and rags at this hospital, it was some time ago proposed to make a trial of the patent lint manufactured by " The National Linen Company," to see if any improvement in the quality and saving in the cost could be effected in that article. On examination it was found that a pound of the A 2 lint, at 2*s*., certainly had a greater extent of surface than the same weight of the ordinary rag lint supplied to the hospital at 2*s*. 1*d*. It was found, however, that the gain was more than counterbalanced by some objections which the surgeons and assistant-surgeons made to its use. Passing over several of the minor objections, such as its being too fluffy, and its not giving sufficient support, they pronounced it inconvenient of use, inasmuch as it would not tear in any direction. The use of the old-fashion rag lint is, therefore, preferred here, which has the advantage of tearing readily in one direction, and of being strong, and giving great support in the other.

The quantity of lint and rags used here in 1849, was as follows:—

	lbs.	*Surface*	*Cost.*
Lint	1140	2596 square yards	£118 15 0
Rags	720	4040 "	51 0 0

I am, Sir, your most obedient servant,

T. H. Tustin.

ANALYSES OF ASTROP WELLS AND SUTTON BOG MINERAL WATERS.

BY MR. THOMAS BEESLEY,

Member of the British Archæological Association.

King's Sutton, to which parish that part of Astrop once so well known as Astrop Wells belongs, is situate at the S.W. extremity of the county of Northampton, about four miles S.E. from the town of Banbury. It derives its name of Sutton (A. S. Sud-ton) from its position *south* of the ancient Romano-British settlement at Blackland, in the same parish, of which numerous vestiges in the shape of coins, pottery, &c., are still remaining; as does Astrop (A. S. East-porp) from being *east* of the same place.

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* On inquiry we find that this variety of lint is not now manufactured. The sample had been some years in our possession.

Astrop Wells has long been famous. It is not improbable, from its vicinity to a Romano-British town, that it was known to the Romans during their occupation of this country. Be this as it may, the name by which it is still known—St. Rumbald's Well, from its dedication to a Saxon saint, who is said to have been born at King's Sutton*—would strongly incline us to believe that it was, even in the time of our Saxon ancestors, one of those *holy wells*,† the superstitious observances connected with which more than once drew down the censures of the church. It was not, however, until the seventeenth century that it acquired any celebrity as a medicinal water, unless the following entry of November, 1579, in the Banbury church register refers to it:—"Richard Halse, of Sarú, in the cowntie of Wiltsheire, was buried the 24 day, in comming from the newe Well." It is said to owe its first introduction to notice to the celebrated Dr. Willis, who, having observed on one of his journeys the bright red deposit indicative of iron, conceived the project of sending his patients hither instead of to Tunbridge Wells. "Soon after," says Anthony à Wood, "the water was enclosed in a well, and upon the said commendations 'twas yearly, as to this time it is, frequented by all sorts of people." I have a scarce tract published in 1668, entitled "A Brief Account of the Virtues of the Famous Well of Astrop, not far from Oxford, of late so much frequented by the Nobility and Gentry. By a learned Physician. London." According to this "learned Physician," the water "openeth, astringeth, and consolidateth egregiously; it kills Worms in young and old, and expels them; it fastens the Teeth, though ready to drop out; it cures Aches and Cramps in any part of the Body whatsoever, and giveth great ease therein suddenly." About the end of the seventeenth century many persons of note are mentioned as using the water: amongst others, the Lord Keeper Guilford, Lord and Lady Gainsborough, and Anthony à Wood, the Oxford Antiquary. Morton, in his *Natural History of Northamptonshire*, says, "Upon the successes it had, particularly upon the scurvy, asthma, chlorosis, and other like diseases, its fame in a short time extended itself over the kingdom." The celebrated Dr. Radcliffe at one time patronized it warmly; but subsequently, on some disgust, declared he would "put a toad in the well," and decried the water accordingly. Astrop seems to have been in the height of its prosperity during the first half of the eighteenth century. In 1777, Bray says, "The place has been formerly much frequented, but is now out of fashion." It has long been completely deserted as a place of fashionable resort; and even the inhabitants of the place have almost ceased to use the water.

The well is by the side of the public road, not far from Astrop

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* St. Rumbald, according to the hagiologists, was of royal extraction. He was born at Sutton in 662; and although *he lived but three days*, found time to *preach* at Brackley! whither his body was translated next year; as in the year following to Buckingham, where his shrine was much resorted to by pilgrims.

† *Holy wells* are remarkable either for the abundant supply, peculiar appearance, or supposed medicinal virtues of their waters. Their adoration was probably a remnant of paganism. All that I know of in this neighbourhood give the conspicuous red deposit of peroxide of iron.

House, the residence of William Willes, Esq., in a little valley excavated in the Ferruginous Sands and underlying Marls. On the east rises a bold escarpment of the Ferruginous Sands, crowned by the Fuller's Earth and lower beds of the Great Oolite. The surrounding scenery, although it has but little claim to the exaggerated praise of Dr. Short, possesses something of the rich and quiet beauty so characteristic of the rural districts of England. The supply of water is large, perhaps twenty gallons in a minute. Its temperature on the 11th of June, 1850, was 50° F.; and from the abundant flow during all seasons, indicating an origin at some depth, it probably varies little, if it all, from this.

Its taste is faintly chalybeate; and it gives decided evidence of iron with galls and the prussiates. On standing for some hours, even in a filled, well-closed bottle, it lets fall a light brown deposit.

1134.6 grammes gave .0963 Ag Cl = .2099 Cl in 10,000
567.3 " " .272 $Ba\,O, SO_3$ = 1.6478 SO_3 " 10,000
1134.6 grammes was evaporated to dryness and treated with boiling water,
the solution gave .051 $Ca\,O, CO_2$ = .2517 Ca O " 10,000
.1057 $2\,Mg\,O, PO_5$ = .3413 Mg O " 10,000
the sediment gave .425 $Ca\,O, CO_2$ = 3.7458 $Ca\,O, CO_2$ " 10,000
.007 $2\,Mg\,O, PO_5$ = .0467 $Mg\,O, CO_2$ " 10,000
1701.9 grammes gave .026 $Si\,O_3$ = .1528 $Si\,O_3$ " 10,000
.0057 $Fe_2\,O_3$ = .0486 $Fe\,O, CO_2$ " 10,000
.002 $Al_2\,O_3$ = .0117 $Al_2\,O_3$ " 10,000
.7015 $Ca\,O, CO_2$ = 4.122 $Ca\,O, CO_2$ " 10,000
The $Ca\,O\,CO_2$ of the separate determinations = 4.195 " 10,000
49.2 grammes gave .035 residue .... = 7.114 " 10,000
487.8 " " .017 $Pt\,Cl_2, K\,Cl$ = .1064 K Cl " 10,000
616.9 " " .084 K Cl + Na Cl = 1.3616 KCl + Na Cl " 10,000

In 10,000 *parts of the Astrop Wells Water.*

Sulphate Potash	.1243
" Soda	1.5247
" Lime	.6122
" Magnesia	.5636
Chloride Magnesium	.2846
Carbonate Lime	3.7458
" Magnesia	.1037
" Iron	.0486
Alumina	.0117
Silica	.1528
	7.1720

There is a slight excess of magnesia, as is always the case in analyses of such waters, which is reckoned as $MgO\,CO_2$, although a portion of it may probably exist in other forms.

The above table will sufficiently account for the vanished fame of Astrop Wells.

SUTTON BOG.

This spring is in the flat, marshy field immediately adjoining the western end of the village of King's Sutton. It was opened in the year 1749, as an adjunct to the then celebrated spring of Astrop; on which occasion a breakfast was given with great ceremony by Anthony Keck, Esq., of Leicestershire, in gratitude for benefits received at the latter place. It probably never attained any great repute, as the spa was then hastening to its decline; but more fortunate than its neighbour, it retains some share of its former popularity, being still much used by the villagers, and occasionally supplied to the neighbouring towns and villages. I cannot learn that it is used for any particular diseases; but rather as a prophylactic. The labourers are in the habit of taking it a-field with them, as they have found by experience that it never does mischief, or, as they express it, "causes a surfeit" when drunk by a person in a state of profuse perspiration. The stimulating effects of its saline constituents may account for this.

This spring appears to have its source in the Lias Marl. The quantity of water discharged is small. Its temperature on the 5th of April, 1848, was 50° F., and observations at other times accord with this. Sp. gr. 1002.3. Taste soft, and rather brackish.

259.17 grammes gave	.640	Ba O, SO_3	=	8.4873 SO_3	in 10,000
	.639				
129.58 " "	.260	Ag Cl	=	(deducting .006 I) 4.9548 Cl	" 10,000
	.2618				
	.259				
8810. " "	.0075	Pd I	=	.006 I	" 10,000
933. " "	.0075	Si O_2	=	.0804 Si O_2	" 10,000
	.001	$Fe_2O_3+Al_2O_3$	=	.0107	" 10,000
	.0835	Ca O, CO_2	=	.8949 Ca O, CO_2	" 10,000
	.0525	2 Mg O, PO_5	=	.4222 Mg O, CO_2	" 10,000
259.17 " "	.596	K Cl + Na Cl	=	23.0573 Na Cl	" 10,000
	.0112	Pt Cl_2, K Cl		and	
	.606	K Cl + Na Cl		.1320 K Cl	" 10,000
64.79 " "	.1755	residue	=	27.0875	" 10,000

No bromine. Traces of nitric acid, lithia, and some organic matter.

In 10,000 *parts of Sutton Bog Water.*

Sulphate Potash	.1542
" Soda	14.9336
Chloride Sodium	8.1650
Iodide Sodium	.0071
Carbonate Soda	2.3530
" Lime	.8949
" Magnesia	.4222
Oxideiron, and Alumina	.0107
Silica	.0804
	27.0211

This water has been improperly described as *sulphureous* *—there is not a trace of hydrosulphuric acid or alkaline sulphurets.

For further particulars respecting the spas at Astrop and Sutton see Beesley's *History of Banbury*, Baker's *Northamptonshire*, Morton's *Northamptonshire*, and Dr. Short's *Treatise on Mineral Waters*.

Banbury, November 1850.

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* Nicholson's *Dictionary of Chemistry*, and elsewhere.

QUANTITY OF ESSENTIAL OIL OF BITTER ALMONDS OBTAINED FROM BITTER ALMOND CAKE.

BY MR. GEORGE WHIPPLE.

The following statement of the quantities of essential oil of bitter almonds obtained from bitter almond cake, may perhaps be interesting to some of the readers of the Pharmaceutical Journal:—

Farina Amygd. Amaræ.				*Ol. Essent. Amygd. Amaræ.* (avoirdupois weight).	
cwt.	qrs.	lbs.		lbs.	oz.
267	1	0	yielded	394	13¾
20	0	0	"	34	8
15	0	0	"	25	4½
22	0	0	"	38	11¾
18	0	0	"	28	14
28	0	0	"	45	13¼
84	0	0	"	144	9½
23	1	0	"	40	13
48	2	21	"	92	3¼
50	0	0	"	107	7¾
12	0	0	"	23	7
20	0	0	"	40	9¾
44	3	13	"	96	11
31	3	20	"	63	5¼
22	0	0	"	40	3¼
48	0	0	"	90	8
52	0	0	"	96	2
44	2	21	"	76	2
30	0	0	"	46	15½
35	2	5	"	63	2
Total 917	0	24	yielded, at twenty operations,	1590	4½

This shows that 1*cwt.* of bitter almond cake yields, on the average, about 1lb. 11¾ozs. of essential oil.

The oil obtained consists of two essential oils, differing in specific gravity, but both heavier than water. By mixing them together they become turbid, but are rendered transparent by filtration.

The water which comes over with the oil is turbid, but is rendered clear by the addition of hydrocyanic acid. This water is not used for culinary purposes. The fact is, peach-water, black cherry-water, and the almond-water used in our kitchens, is, or should be, the old-fashioned sort, prepared as follows:—

Amygd. amaræ. cnt. ℔j.
Water, q.s. to yield 8lbs. of distilled water.

5, *Mortimer Place, De Beauvoir Square,*
Kingsland.

MITCHAM: ITS PHYSIC GARDENERS AND MEDICINAL PLANTS.

(Continued from p. 236.)

VI. MINTS.

We believe that these (especially peppermint) were among the first medicinal plants cultivated at Mitcham.

Three species are now cultivated in that locality; these are, Spearmint, *Mentha viridis*, Linn.—Peppermint, *Mentha piperita*, Linn.—and Pennyroyal, *Mentha Pulegium*, Linn.

These three species are cultivated in a similar manner. The mode of propagation is from young plants, which spring from the runners.

Early in the spring (April or May) the plants are drawn and planted out in rows. The space between the plants varies, according to the custom of each grower, from one foot to eighteen inches. Mr. Moore adopts the latter distance, which he finds more favourable to the strong and healthy growth of the plants. By placing them closer together, he considers that, although a larger number of plants are contained on an acre, the amount of produce is diminished by the crowding.

The first season they require to be constantly attended to during the weeding time, and should receive at least six or more hoeings, and this essential part of the cultivation is scrupulously attended to every succeeding year.*

In or about the month of October (November or December, according to Malcolm) the beds are trenched like asparagus beds, the earth being piled up between the trenches, to the width of three or four feet, and sufficient depth to protect the roots during the winter. Unless this be done, the repeated weedings during the summer will have so exposed the roots of the plants as to make them more susceptible of frost and wet, and so much the more liable to be thrown out of the ground by severe frosts. This covering up is not necessary for pennyroyal, a plant which is to be destroyed.

Malcolm, in 1805, states that Mr. Moore usually grew about one hundred and fifty acres of peppermint, four acres of spearmint, and two acres of pennyroyal, and that fifty acres of the peppermint were renewed annually. This renewal he found to be absolutely necessary, because the wet and frost injure the roots very much, and, when severe, kill them. It follows, therefore, that each plant will last about three years. We were recently informed at Mr. Moore's, that the ground is changed every two or three years. The crop is gathered in the months of June, July, or August, according to the state of the season. The quantity now in cultivation at Mitcham is, of peppermint from 520 to 550 acres, spearmint seven acres, and about seven acres of pennyroyal.

The following were the expenses of cultivation in 1805:—hoeing, six shillings per acre; and covering, twenty-one shillings per acre.

Malcolm states, on the authority of Mr. Moore, that the produce of peppermint varies from four to six tons per acre, the average being five tons, and the price is stated to vary from 50*s.* to £10 the ton, the average being £5. Mr. Bridger says from two tons to three tons per acre would be the average of five years. This, however, applies to the herb in the dry state. In 1805 there were no stills in Mitcham, and the herb was sold fresh.

The amount of oil yielded bears no definite relation to the quantity of the plant. The summer of 1848 was cold and wet, and the plant, although bulky, yielded a small proportion of oil. In 1849 the quality of the plant was much better, but the bulk much less. A larger supply of oil was obtained from about half the quantity of herb. The present season has been an average one.

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* Malcolm, *Compendium of Modern Husbandry*, vol. iii., 1805.

We are informed, that on a rough estimate, a ton of peppermint yields from two-and-a-half to three-and-a-half pounds of oil; pennyroyal twice as much; spearmint about half as much as peppermint. The cultivation of spearmint is less profitable than of peppermint, and it is therefore grown only in sufficient quantity to meet the actual demand, and, in the absence of orders beforehand, [the ground is otherwise appropriated. Pennyroyal is the least valuable of the three species of mint. The mints are chiefly used for distillation.

VII. LIQUORICE.

Two species of *Glycyrrhiza* or Liquorice have been employed, on account of the sweet underground stem called liquorice-root; these are, *G. glabra*, common or smooth liquorice, and *G. echinata*, echinate podded liquorice. At Mitcham, however, the first mentioned species is the only one cultivated. The quantity in cultivation is about fifty acres.

Common liquorice is sometimes cultivated in gardens as an ornamental plant. It rises to the height of four or five feet, having a smooth erect stem, and blueish or purplish papilionaceous flowers. By the herb growers, it is cultivated in beds three or four feet wide, banked and trenched. The underground stem (or root as it is usually called) throws out runners, from which new plants are obtained. Portions of these runners, three or four inches in length, having two or three buds, are cut off in the spring (about March) and planted out. The beds are kept clean during the summer; and about November, the old stems or stalks are cut off close to the ground with a sharp pruning-knife. The spaces between the rows are dug up and left rough. No return is obtained until the third, fourth, or fifth year, by which time the plant has arrived at sufficient maturity. Every year the tops are cut off, the ground weeded, and runners taken, if wanted, for planting. The same ground will answer for liquorice for many years in succession, but it requires a plentiful supply of manure.

The roots are usually taken up with a three-pronged fork, and stacked in trenches until wanted. The stacking is effected in a moderately dry and sheltered place, the roots being placed upright with layers of earth between them, and a layer of several inches thick on the top. In this manner the stock is preserved in good order for several months. They are taken out when wanted, by *cwts.*, and before being sent to London, are deprived of their crowns by chopping.

The fibres and small branches, which are removed in trimming, are called *offal*, and were formerly dried and ground to powder.

Malcolm, on the authority of Mr. Moore, says, that 20 cwts. of root per acre may be reckoned a fair crop; and that prime sorts sold (1805) for from 50 shillings to £3 per cwt., and the powder (of the offal) for £3 per cwt. The expense of taking up the root by the fork costs £10 per acre. Mr. Bridger says £14 or £16 per acre.

ON THE MANUFACTURE OF PYROLIGNOUS ACID, PYROXYLIC SPIRIT, OR WOOD NAPHTHA, AND THE COMMERCIAL ACETATES OF LIME, SODA, AND LEAD, AND ACETIC ACID.

(*Concluded from page* 198.)

PART VII.—*Acetate of Lead or Sugar of Lead: Manufacture of the Brown Acetate or Pyrolignite of Lead.*—The distilled pyrolignous acid is saturated with litharge in a tub, and the muddy solution ladled out into a large tun to settle, which it speedily does; the solution after settling is ladled into a pan (malleable iron), which may be made of cast iron, 6-ft. long, and 4-ft. broad. The solution is made to boil in this pan, and allowed to settle, it is then transferred into a large hemispherical pan, capable of holding about 300 or 400 gallons, when it is brought down to about crystallizing strength. When the solution has become dense enough to crystallize, about three times its bulk of water is run in upon it, whilst boiling, the solution being constantly stirred. By this treatment, a considerable quantity of pyrolignous matters may be skimmed off as fast as they rise to the surface; when they are removed, the evaporation goes on as before. If the solution be still too much coloured, another dose of water must be given. A little practice soon enables us to know where the evaporation should be checked. The ordinary method is, to rinse a ladle (which is used to skim off the tar from the solution) through the liquid, and observe how many drops of solution fall from it before the solution takes a stringy appearance; if only ten or twelve fall, then it is strong enough. The liquid is now ladled out into malleable iron pans, 5-ft. long by 3-ft. broad, and about six inches deep, the sides being bevelled, or sloping outwards, from below upwards, to crystallize. After becoming sufficiently firm, the sugar of lead is taken out by inverting the pan on a cloth. The pots used in the above process are heated only at the bottom.—*A. P. Halliday.*

Manufacture of the White Acetate of Lead.—This is prepared by dissolving litharge in acetic acid; the acetic acid is first placed in a vessel, and the litharge added by degrees, well stirring the mixture until the solution does but slightly redden litmus paper; a quantity of water, equal to about one-half of the acid employed, is then run into the lead solution; heat is then applied, and the mixture slowly evaporated for about twelve hours, or until it has acquired a density of about 1.500. During evaporation any impurities which rise to the surface are skimmed off, and when the solution has acquired its proper density it is run off into the crystallizing pans. When the mass of crystals has become sufficiently hard to allow of its removal *en masse* from the crystallizers, it is drained and placed on wooden racks in the drying house, and when dry cleaned and broken up into fragments for the market.

The mother-liquor, containing neutral and basic acetates of lead and other metallic salts, may either be treated with vinegar, evaporated, recrystallized, and the residue employed as washings in subsequent operations, or it may be decomposed by carbonate of soda or lime, and used as carbonate of lead, or dissolved in acetic acid, and the supernatant acetate of soda or lime recovered.

The vessels employed in the manufacture of acetate of lead are in most cases made of lead. In Wales the mixing pans are of lead three-quarters of an inch thick, seven feet long, by four and a half feet wide, and one foot deep. These pans are set on iron plates over arches, and the fire-places are outside the building in order that the acetate may not be darkened by the sulphurous vapours from the coal. The crystallizing pans are of wood lined with thin copper, and are about four feet long by two feet wide, and from six to eight inches deep, sloping inwards at the edges. At Pitchcombe the mixing and crystallizing vessels are both of copper, having a strip of lead soldered down the sides and across the bottom of the vessel to render the copper more electro-negative, there is thus no action on the copper from the acetic acid. Great care is requisite in the drying of the sugar of lead; the temperature of the drying house should not exceed 90° Fah. In Wales the heated air of a stove placed outside the drying house is conveyed through pipes passing round the interior; at other places steam heat is employed for this purpose, which is much to be preferred on account of its being more easily regulated.

We now come to speak of the product of sugar of lead from a given quantity of litharge. 112 lbs. of good Newcastle litharge should produce 187 lbs. of sugar of lead by the employment of 127 lbs. of acetic acid of sp. gr. 1.057, but not more than 180 lbs. is obtained in practice. The quantity of produce given in Ure's *Dictionary of Arts and Manufactures* and in other works, is evidently a misprint, being almost three times the weight of the litharge employed. A manufacturer of sugar of lead would indeed be fortunate who could obtain such a return. In one works in Wales, a ton of Welsh litharge produces, with the acid obtained from one ton of acetate of lime, from twenty-eight to thirty cwt. of sugar of lead; and in another manufactory one ton of best Newcastle litharge, with the acid from one ton and a half of acetate of lime, produces thirty-three cwt. of acetate.

The following process with metallic lead, recommended first by Berard, is easily executed, and is said by Runge to yield a good product with great economy. Granulated lead, the tailings in the white lead manufacture, &c., are put in several vessels (say eight) one above the other, on steps, so that the liquid may be run from one to the other. The upper one is filled with acetic acid, and after half-an-hour let off into the second, after another half-hour into the third, &c., and so on to the last or eighth vessel. The acid causes the lead to absorb oxygen rapidly from the air, evolving heat, so that when the acid runs off from the lowest it is thrown on the upper vessel for the second time, it forms a certain quantity of acetate of lead in solution, and after passing through the whole series is so strong that it may be evaporated at once to crystallize. There are two points of importance in this manufacture; whatever method may be pursued, they are to employ a strong acid, that less time and acid may be lost in concentrating the liquid, and to keep the solution always acid, to prevent the formation of a basic salt.

It may not be amiss to call attention here to a process patented about ten years since for preparing acetate of lead and other acetates. This process consists in employing the acid in the state of vapour, to act upon the bases, instead of using it in the liquid form. A vessel is provided of adequate capacity for the quantity of acetate required, and constructed of such material as will not be readily destroyed by the acid. The top of this vessel is closed hermetically by a cover, fastened down by any convenient means, and in the lower part of the vessel is placed either a minutely perforated false bottom, or a coiled tube of several convolutions, minutely perforated, to permit vapour to pass through freely. To prevent the loss of acid, there is also placed, at different degrees of elevation, several perforated diaphragms, similar to the false bottom just mentioned, on each of which is spread a layer of litharge, after which the cover of the vessel is to be accurately closed. By means of an ordinary distillatory apparatus, liquid acetic acid (strong or weak, pure or impure) is converted into vapour, which vapour is conducted by means of a pipe into the convoluted perforated pipe before mentioned, or between the real bottom of the vessel and the perforated false bottom; hence the vapour passing through the numerous perforations of the false bottom and diaphragms, diffuses itself throughout every part of the vessel, its acid entering into combination with the base employed, and forming the acetate, which falls to the bottom of the vessel, and in its descent meets with the ascending streams of vapour, the acid of which renders it perfectly neutral; meanwhile the more aqueous parts of the vapour become liberated, and maintaining their temperature ascend, and in their passage through the successive layers of the base are thereby deprived of their remaining acid. The vapour thus reduced to simple steam is allowed to escape through one or more pipes at the top of the vessel; and as this stream still maintains a boiling temperature, it is conducted through a worm to evaporate the acetate, or the mother-liquor, by its heat. The distillation of the acid is continued until the acetate in the vessel is arrived at the proper degree of concentration for crystallization, which is easily ascertained by examining a small quantity drawn off by a cock at the bottom of the vessel, by which cock the whole contents are discharged when the operation is completed.

As the operation draws to its close, by nearly all the base having combined with the acid, the vapour issues out of the vessel charged with a certain portion of acid; and in order that no loss may be sustained by its escape into the atmosphere, it is conducted into another vessel prepared like the first mentioned, but charged superabundantly with the base, to take up every particle of the acid issuing out of the first vessel, until the operation in that first vessel is ended. As the temperature of the solution of the acetate can never exceed that of the vapour, the crystalline product is of fine quality.

PART VIII.—*Manufacture of Acetic Acid.*—In treating of the manufacture of acetic acid we shall not enter upon any other processes than those of the decomposition of the acetates, as effected either by heat or by sulphuric acid.

Acetic Acid obtained by Decomposition of the Acetates by means of Heat—Aromatic Vinegar.—We have already mentioned, whilst speaking of the production of pyro-acetic spirit, that when the acetates are submitted to dry distillation, acetic acid is produced. The following is another extract from the table then quoted, showing the quantity of acetic acid obtained by the decomposition of the metallic acetates:—

Acetate of silver	107.309
" copper	84.568
" nickel	44.731
" iron	27.236
" lead	3.045
" zinc	2.253
" manganese	1.285

The crystallized acetate of copper is the salt most usually employed for this purpose—twenty pounds of the powdered acetate are placed in an earthen retort of the capacity of about two gallons, previously luted and exposed to the action of the fire; the elongated neck of the retort is connected with a tubulated receiver, and this with a second and third, the last of which is furnished with a Welter's safety tube, dipping into water. The heat must at first be carefully applied, then gradually increased, and the operation regulated by the development of the gaseous products, which must not be too slow nor too fast. The receivers must be kept cool. When on increasing the heat it is found that no more vapours are given off, the fire must be put out, and the apparatus left to cool. The acid thus obtained has a greenish colour, its specific gravity is 1.061. From 20 pounds of acetate of copper rather more than 9¾ pounds of rough acid are obtained. The residuum in the retort consists of 6¼ pounds of copper in a metallic state, mixed with a small quantity of charcoal. The crude acid thus obtained is next placed in a glass retort of the capacity of about 1¼ gallon, to which is adapted a tubulated receiver, and the retort is heated by means of a sand-bath. The first portions which come over are very weak, and the product should be kept separate until it comes over of a density of 1.072 ; the whole of the remaining product is now collected together, and the distillation continued to dryness. The acid obtained shows a specific gravity of 1.080 to 1.088. The weaker products are redistilled, and the stronger portions mixed with the former. The 9¾ pounds of crude acid furnish in this way six pounds of pure acid, specific gravity 1.085, three pounds at specific gravity 1.042, and half a pound specific gravity 1.023. The small portion of acetone which comes over with the acid imparts an agreeable aroma to it, and the addition of camphor and essential oils constitutes the aromatic vinegar of commerce.

Manufacture of Acetic Acid by the Decomposition of Acetate of Soda by Sulphuric Acid.—Any given quantity of crystallized acetate of soda is placed in a copper still, and a hollow place having been made in the mass of the crystals, a quantity of strong sulphuric acid, equivalent to 35 or 36 per cent. of the weight of the acetate of soda employed, is then poured in at once, the crystals forming the sides of the heap in the still are then pushed down into the acid, and the whole stirred with a long broad wooden spatula ; the head is then put on and luted, and the connexion made with the refrigerator. Nearly four cwt. of acetic acid, of specific gravity 1.060, may thus be obtained from three cwt. of acetate of soda, which only requires to be passed through a calico filter (of the form described in Mohr and Redwood's *Practical Pharmacy*, page 203, fig. 211) on which some animal charcoal has been placed, to fit it for the market. A small quantity of acetic ether is often added to flavour it.

The still employed should be of stout copper (the solder used in its construction should be silver solder), having its lower half set in an iron jacket, which either receives the high-pressure steam to be used as the heating medium, or contains oil, tallow, or fusible metal, according as either of these substances may be preferred for use. In the former case a cock is placed at the lower part of the casing to let off the condensed steam from time to time ; and in the latter case the iron jacket is placed over the fire, the contents of the still receiving sufficient heat from the heated tallow, oil, or metal with which the copper still is in contact. A safety tube should be attached to permit the rise and escape of the heated oil, &c., should the temperature be raised too high.

The head of the still is of earthenware, and an earthenware, silver, or block tin worm may be employed to condense the acid vapour, according to the supply of water which can be obtained for condensation ; or a series of Woulfe's stone-ware receivers, of about twenty gallons each, one-third full of water, may be connected with the earthenware head of the still. In this latter case, at the close of an operation, the acid in the first receiver will be found to be stronger than the second, the second than the third, &c.; and if the union of the contents of the whole series will not furnish an acid of the strength required, the stronger portions may be drawn off from the first and second receivers, and the weaker portions in the third and fourth receivers may be placed in the first and second for the next operation. A silver arm to connect the head with the earthenware worm is sometimes used, a regular supply of cold water being kept dripping on the metallic arm. The residuum left in the still after the distillation of the acid, is sulphate of soda, which should be in the state of an almost dry crystalline powder, when the process has been well conducted : this may be dissolved in water, and the solution filtered, evaporated, and crystallized ; or it may be used in the manufacture of acetate of soda.

Manufacture of Glacial Acetic Acid.—Acetic acid may be obtained in a glacial state by using dry acetate of soda from which the water of crystallization has been expelled by heat ; to this is added about its own weight of strong oil of vitriol, specific gravity 1.85. The first three-fifths of the product should be collected separately, the last two-fifths will crystallize.

Manufacture of Acetic Acid by the Decomposition of Acetate of Lime by means of Sulphuric Acid.—Large quantities of this acid are employed in the manufacture of acetate of lead and other commercial acetates, white lead, and emerald green; also in the preparation of the inferior class of pickles, &c. &c. Much of the rough acid is sent from Wales to London, and purified by re-distillation. This rough acid is obtained in Wales and other parts of the country in the following manner:—A cast-iron cylinder, about four feet long and two feet wide, closed at one end, is fitted with an iron rod passing through its interior, and furnished with numerous projecting pieces of iron, which reach almost from the centre rod to the inner sides of the cylinder. The other end of the cylinder is screwed on so as to be readily removed at any time when the cylinder is to be cleaned or repaired. This end is divided into two parts, one of which, occupying a space of about two-thirds of the whole, is fixed on the upper part, the other one-third is occupied by a moveable door, closing an aperture through which the contents of the cylinder may be removed; through this upper part one end of the iron rod above-mentioned passes, and is attached to a handle, by means of which a rotatory motion is communicated to the rod and its appendages, and the contents of the cylinder are kept in continual agitation. This vessel is termed an agitator. It is placed in a horizontal position on a mass of brickwork or masonry. At its upper part is an opening, through which the acetate of lime, sulphuric acid and water is passed; motion is given either by steam or manual power. When the mixture is complete the door is opened, and the contents of the cylinder discharged into a tub or other vessel placed underneath the front of the cylinder. The pulpy mass is next transferred to shallow iron trays two feet wide and from two to four feet in length, and two inches deep. These are placed in cast-iron cylinders about five feet long and three feet wide, and each layer of trays is separated, the one from the other by means of iron rods placed between them; the cylinders are exposed to the direct action of the fire, and the acetic acid passes off in the form of vapour, which is condensed by passing it through leaden worms immersed in cold water.

This impure acid, which is contaminated with sulphurous acid and free sulphur, produced by the re-action of the tarry matter of the acetate of lime or the excess of sulphuric acid, is then run into leaden vessels, placed in an iron cylinder and submitted to distillation. The liquid product is condensed by passing it through an earthenware worm. The acid in this state is employed in the manufacture of sugar of lead. Fifteen cwt. of brown acetate of lime, with seventy-five per cent. of sulphuric acid of specific gravity 1.770, and ten gallons of water, produce about 1500 pounds of rough acid of specific gravity 1.070. Sometmes a larger quantity of water is employed. On the small scale the following results were obtained:—

Acetate of Lime. lbs.	Sulphuric Acid. lbs.	Water. lbs.		Acetic Acid. lbs.	Specific gravity.
12 Grey	9	15	produced	21½	1.056
12 "	9	10	"	17	1.073
12 Brown	9	15	"	18	1.050

On the large scale, one ton and a half of rough acetic acid, of specific gravity 1.050, should be obtained from one ton of good acetate of lime, and three-quarters of a ton of sulphuric acid. Acetate of lime may be so prepared, and the decomposition and rectifying processes so carried on, that the acid obtained is not readily distinguishable from that obtained from acetate of soda.

At some works copper stills, set over the naked fire, are employed, and the acid is redistilled in copper stills, set in a sand-heat. Iron stills of various sizes, with a flat cover, formed of magnesian lime stone, or of rough burnt clay, or of metallic tin, are also used. Large stills are not desirable, because towards the end of the distillation, decomposition of the acetic acid is readily effected, in consequence of the destruction which a portion of the mass in contact with the bottom undergoes, whilst all the acid contained in it is being driven off. The distillation should be begun with a gentle fire, and should be carried on without much increasing the heat.

ON THE IMPURE PYROLIGNITE OF ALUMINA AS A MORDANT FOR RED COLOURS.

With a few Remarks on Mordants in general.

BY F. CRACE CALVERT, ESQ., F.C.S.
Member of the Royal Academy of Turin, &c.

On reading the interesting articles on Pyrolignites and Acetates which have appeared in the Pharmaceutical Journal, I am induced to communicate a few facts which I have ascertained relating to the impure pyrolignite of alumina, commonly termed among dyers and calico-printers, red liquor, extensively employed as a mordant to obtain fine Turkey reds, or red, pinks, chocolates, &c., on calico, cotton yarn, linen cloth, and thread.

It is of paramount importance to the calico-printer that this dyeing agent should be always of one strength, and contain the same amount of mordant, especially as the various shades of madder reds and pinks fixed on cloth depend on the relative strengths of the mordants employed, previously to the cloth passing into the madder becks.

Before discussing the different red mordants found in trade, let us briefly consider what a mordant in general is, and more particularly what are the properties of a red liquor, and the composition it should have to be considered of a first-rate quality.

A mordant is generally considered to be a substance which has an affinity for colouring matters. But this is not sufficient to constitute a mordant, it is necessary that it should also have an affinity for the cloth, and form a bond of union between the colouring matter and the cloth, two substances which, of themselves, have often no affinity. It is also essential that the mordant, although applied to the cloth in a soluble state, should have the property of becoming insoluble, or but sparingly soluble, in water. Again, it is highly essential that the mordant in combining with the colouring matter, should add to its brilliancy and richness. Now there are but few bodies which combine all these properties, and out of all the metallic oxides we know only seven or eight which can be used as mordants; these are alumina, oxides of iron, manganese, copper, tin, cobalt, and lead. An example of the affinity and influence of mordants is shown by a piece of calico dyed in madder, and although the essential colouring principle of madder is of an orange red (*alizarine*), it nevertheless produces black, purple, or lilac with oxide of iron, according to the strength of the iron mordants, and red, pink, &c., when alumina has been fixed; and with a mixture of the two, chocolate or puce colours are the result. These different colours come from one colouring principle, the difference being only due to the mordants.

A mordant, then, may be defined as a substance which has an affinity for the cloth and for the colouring principle, and which can so modify its molicular arrangements as to reflect various rays of light. The chemical nature of the oxide or acid is of great importance in the application of mordants. The acid should be volatile, and have but a weak affinity for its base, and which can be easily driven off by a moderate heat, such as acetic acid. If this cannot be obtained, an acid should be chosen which has the property of forming an insoluble sub-salt. For example, when oxalate of alumina is applied to cloth, and this submitted to the action of steam, a sub-salt is produced which has an affinity for the cloth. The influence of the base is considerable, and it should be such as to retain water as a hydrate, for if it be completely dishydrated it loses its affinity for colouring principles. This fact is easily proved by boiling a colouring principle with hydrate of alumina, or with anhydrous alumina, and also when the mordanted cloths are passed on too highly heated cylinders to dry them.

The red mordant is fixed on the part required of a piece of calico by thickening it with calcined farina, and for every gallon of liquor generally from four to six pounds of farina are employed.

The calico is then printed by copper rollers, and afterwards exposed in large rooms for from two to four days, when the pyrolignous acid gradually flies off, and leaves on the cloth a very basic acetate and sulphate of alumina. The pieces are now ready to pass into a hot-bath, composed of 70 lbs. to 80 lbs. of cow-dung per 300 to 350 gallons of water, heated to a temperature of 180°. Sometimes cow-dung is replaced by a substitute called dung-substitute, discovered by Mr. Mercer, an eminent practical chemist of this neighbourhood, and is composed of sulphates, carbonates, and phosphates of lime and soda.

The object of this operation, which renders the cloth fit to pass into the dyeing madder becks, is to remove all or nearly all the sulphuric acid of the tribasic sulphate of alumina, together with all the acetic acid which may remain combined with the alumina.

A good red mordant must therefore be one which, when fixed on the cloth will loose nearly all its acetic acid when exposed to the atmosphere, and leave a very basic salt.

There is a very easy method which I have found out of ascertaining this point, it consists in evaporating some of the mordant; if it is good, a deposit of a very basic sulphate of alumina will separate from the liquor and fall to the bottom of the vessel in white flocks, as the liquor cools.

The next point to enquire into is the composition which a red mordant should have.

At first sight it would appear that as alumina is the intermediate fixing agent, the pyrolignite of alumina by its easy decomposition into acetic acid and alumina would be the one preferred; but practice has shown that a sulpho-acetate of alumina gives the best results, and which is composed as follows:

$$Al_2\,O_3 \left\{ \begin{array}{l} +\ SO_3 \\ +2\ C_4\,H_3\,O_3 \end{array} \right.$$

And prepared by mixing together

453 lbs. of ammoniacal alum.
379 lbs. of acetate of lead, or 315 lbs. of pyrolignite of lead.
1132 lbs. of water.

Or,

383 lbs. of sulphate of alumina.
379 lbs. of acetate of lead, or 315 lbs. of pyrolignite of lead.
1132 lbs. of water.

Or,

453 lbs. of alum, and a quantity of solution of pyrolignite of lime, amounting to 158 lbs.

Or,

333 lbs. of sulphate of alumina with the same amount of pyrolignite of lime.

These substances are well stirred together for several hours, complete double decomposition ensues, sulphate of lead is deposited, and sulpho-acetate of alumina remains in solution with one equivalent of sulphate of ammonia, proceeding from the ammoniacal alum employed, as only two equivalents of sulphuric acid are removed from the four which alum contains.

But as sulphate of ammonia is of no use in the process of mordanting cloth, and as it may be considered as increasing the price of the articles to the manufacturer, a very intelligent firm of this town has had the good idea of replacing ammoniacal alum by sulphate of alumina, thus not only rendering the liquor cheaper; but as their liquor marks the same strength as that of other manufacturers, namely, sp. gr. 1.085, or 17 Twaddle. The red mordant D of this firm contains a larger amount of useful agent under the same bulk of fluid.

The following analyses clearly show this point :—

COMPOSITION OF FOUR MORDANTS PER GALLON.

SUBSTANCES.	FORMULA. $Al_2 O_3, SO_3, 2 C_4 H_3 O_3 + N H_3 SO_3 HO$.						FORMULA. $Al_2 O_3, 2 SO_3 C_4 H_3 O_3 + N H_3, SO_3 HO$.			FORMULA. $Al_2 O_3 + SO_3, 2 C_4 H_3 O_3$.		
	MORDANT A.			MORDANT B.			MORDANT C.			MORDANT D.		
	GRA IN	OZ.	GRS.	GRAINS.	OZ.	GRS.	GRAINS.	OZ.	GRS.	GRAINS.	OZ.	GRS.
Alumina	1680.0	3	18	1830.0	4	19	1239.0	2	365	2164.4	4	416
Sulphuric Acid	2642.5	6	20	2800.0	6	178	3017.0	6	395	1664.6	3	323
Acetic Acid	3369.8	7	307	3570.0	8	70	1281.7	2	406	3679.2	8	179
Ammonia & Water	.674.1	1	236	.910.0	2	35	.653.1	1	215			

From these results it is easy to perceive that the composition of red liquors varies a great deal in Manchester, and that it is of importance to our extensive calico-printing firms to inquire more than they at present do into the composition of their red mordants. By doing so I have no doubt they will arrive at two ends, viz., account better than they do for the superiority of some prints over others, and discover why certain persons always believe the peculiar red mordant they employ the best; and if results do not come up, attribute failures to the madder, &c.

I may mention here a fraud or two which I have discovered in the pyrolignite of iron, or black liquor, employed by calico-printers and dyers for obtaining black, grey, maroon, chocolate, &c. It is but just to state that this fraud is mainly owing to the dyers and calico-printers themselves, who require articles at a lower price than they can be produced.

The products added into some black liquors are muriate or sulphate of iron in proportions varying from ten to thirty per cent. To detect them the black liquor is treated by carbonate of soda, which, in throwing down the oxide of iron, produces chloride of sodium and sulphate of soda—the whole is then thrown upon a filter. The liquor when evaporated to dryness, and calcined to destroy organic matter, leaves a residue which, on being dissolved, gives, after being rendered acid with nitric acid, a white curdy precipitate with nitrate of silver, and a white pulverulent one with nitrate of baryta, if chlorides or sulphates are present in the liquor.

Royal Institution, Manchester.

HEAT AND LIGHT.

MELLONI has just published, in French, at Naples, the first part of a work, entitled "*La Thermocrose; ou, la Coloration Calorifique*," the object of which is to show that the luminous and calorific rays possess the same heterogeneous constitution, proceed from one agent only, and form a single series of radiations, part of which affect the organs of vision, whilst the other is revealed to our senses only by phenomena which accompany the heating of bodies. In short, that rays of heat are distinct in kind and properties like the rays of different colours, which, differing in refrangibility, compose white light.

OIL FOR LUBRICATING MACHINERY.

M. **Boudet** describes an oil, which the French call *liard*, used for greasing machinery. It is made by adding one part of caoutchouc, cut into small pieces, to fifty parts of rape-oil, and applying heat until the caoutchouc is nearly all dissolved. This oil is more unctuous than most of the oils used for machinery, and is not so much affected by the rapid motion of the parts to which it is applied, or by other influences to which it may be exposed. It remains fluid at temperatures below the freezing point of water, and offers little obstruction to the commencement of motion in the machines.

M. Boudet suggests the following method of determining the proportion of caoutchouc contained in this kind of oil :—A weighed quantity of the oil is saponified with potash, and the dry soap treated with spirit, which dissolves the soap with the aid of heat, and leaves the caoutchouc. The insoluble residue is washed with water containing a sixth part of spirit.—*Journal de Pharmacie.*

PRESERVATION OF PROTOSULPHATE OF IRON.

BY M. GIOVANNI RUSPINÉ.

The extreme facility with which protosulphate of iron passes to the state of persulphate when exposed to the air, has induced many Chemists to seek an easy and sure method of preventing this oxidation. Selmi, Geiseler, Bousdorff, Abich, Boudet, and Poma, have each in their turn devised methods of preservation, which have not been found to answer perfectly. M. Ruspiné having directed his attention to the same subject, and tried several processes, recommends the following as the best:—The crystals of protosulphate of iron, perfectly pure, are dried, as quickly as possible, between folds of filtering paper, on taking them out of the mother-liquor. They are then put into a drying-closet, the temperature of which is 86° Fahr., where they soon effloresce. As soon as the salt has been reduced to this state, it is rapidly powdered, passed through a fine sieve, and put into well-stopped bottles. Thus prepared, the protosulphate of iron may be kept for any length of time in a state of purity, although exposed to air and to the influence of light. It will form a clear solution, and will contain only a trace of persulphate, which will be of little consequence. The preservation of the salt is due, in this case, to the abstraction of interposed water not in a state of chemical combination, which is always present in the crystals in their ordinary state, and which, under the influence of air, causes the peroxidation of the salt.—*Journal de Chimie Médicale.*

ON POLYPODY.

BY X. LANDERER.

Polypodium vulgare is very scarce in Greece, where it grows in the woods of Euboca and Arcadia. The root is called by the country people *Polypodniza* or *Dendrophtiri* (Δενδροφθειρι). The decoction of the root is used as a wash in *Tinea capitis* and *Herpes serpiginosa.*

ON SOPHORA.

BY X. LANDERER.

Sophora Japonica and *S. heptaphylla*, both imported from the East Indies, yield the *radices* and *semina anticholerica.* They have been employed against cholera. The seeds are imbedded in a viscous mass, which, according to the author, produces remarkably drastic effects, even in doses of three to four grains.—*Pharm. Central-Blatt*, No. 34, 1850, p. 527.

ON THE PREPARATION OF ANHYDROUS PRUSSIC ACID.

BY WÖHLER.

The preparation of anhydrous prussic acid is much facilitated, according to Wöhler, by elevating the neck of the retort to an angle of 45°, and now and then slightly cooling it, so that most of the water may be condensed and flow back; the liquefaction of the chloride of calcium is then not to be feared. Between the neck of the retort and the U tube containing the chloride of calcium, he recommends the introduction of another vessel with a small quantity of chloride of calcium or rough cyanide of potassium. The latter, as well as the tube with the chloride of calcium, is to be surrounded with water of 86° F. If the high condensing vessel be surrounded with a mixture of ice and common salt, the prussic acid is immediately crystallized. The latter is developed by boiling a mixture of ten parts of prussiate of potash, seven parts of sulphuric acid, and fourteen parts of water, over an open charcoal fire. The residue may be converted into prussian blue by boiling it with commercial nitric acid.—*Central Blatt.*, No. xxxvii., 1850.

ON ERVALENTA.

BY PROF. DR. SCHENK.

The remedy sold by Dr. Warton, in Paris, under the name of *Ervalenta*, is, according to Chevallier, lentil meal; whereas, according to Buchner (*Rep.*, B. xcii., p. 78), it has all the characteristics of bean-flour. Dr. Schenk obtained a specimen from Buchner, and gives the following description of it:—Ervalenta is a moderately fine, light yellow powder; grating between the teeth. Both by the lens, as well as by rubbing between the fingers, coarser and finer particles are discovered, the former appearing under the lens to consist of particles having a faintly glittering and crystalline appearance. The taste of the powder agrees with that of the flour of beans (*Phaseolus vulgaris*), and is only distinguished from it by the whiteness of the latter. The peculiarly disagreeable taste of ervalenta suggesting its origin from one of the papilionaceæ, the author had prepared flour of *Ervum Ervilia*, *Vicia Faba*, and *Phaseolus vulgaris*, but found it to agree in colour with none of them, but in taste with bean-flour. The colour agrees mostly with the flour of Indian corn, but is somewhat lighter than that prepared from the yellow grains. Ervalenta also contains a large number of small, yellow, pale brown and dark brown particles. *a*. Under the microscope we observe a large number of single starch grains of various size, partly of a globular, oval, or obtusely-triangular form, frequently furnished with protuberances. They have all a longitudinal, central cavity, with lateral branches, which, in a certain position, appears as a longitudinal, but generally as a stellate slit. Furthermore, fragments of cells, cellular tissue, and isolated cells, both of which contain starch grains and a fine granular substance which is coloured brown by iodine. The small lumps of this granular substance float freely in water, and not unfrequently enclose isolated starch grains. *β*. In the same proportion, as the foregoing substances, are found fragments of cellular tissue of various size, the cells of which enclose polyhedric starch grains with a globular central cavity. The cells of these fragments are large, of rhomboidal form, and contain each a great number of starch grains, each of which is again surrounded by a membrane. Also isolated polyhedric starch globules, not enclosed in cells, are perceived.

The starch globules mentioned under *a*, are, from the nature of the cavity, starch from the cotyledons of papilionaceæ. On comparing them with the different sorts of flour from these plants, they were found, together with all the other constituents, to be identical with the starch and meal of *Phaseolus vulgaris*. One ingredient of the ervalenta is, therefore, bean-flour. Those fragments, however, mentioned under β appertain to the seeds of Indian corn (*Zea Mays*). The starch is such a characteristic constituent of these seeds that they cannot be mistaken, since the mealy parts as well as the horny parts contain the starch, as described above, and also the enclosing cells. The second ingredient is, therefore, flour of Indian corn. The yellow, the light brown, and dark brown particles proved to be, upon a comparison with the respective seeds, the epidermis of the seeds of beans and of Indian corn. The larger, opaque, crystalline particles are chiefly peculiar to the seeds of Indian corn, but partly also to those of beans. Besides these constituents nothing could be discovered with the microscope, nor could any purgative substance, soluble in water, be discovered in it by chemical tests.

Ervalenta is, therefore, composed of nothing else but a mixture of equal, or nearly equal parts of bean-flour and the flour of Indian corn. From the first it derives its taste, and from the latter the colour, which is modified by the bean-flour. As most fragments of the epidermis of the beans are light brown, it is particularly prepared with the varieties of the garden-bean with white and light-brown seeds.—*Buckner's Rep.*, No. xv., p. 321.

SUCCINIC ACID FROM THE RESIDUE OF SP. ÆTHERIS NITROSI.

BY G. REICH.

In the acid residue, obtained by the distillation of alcohol with nitric acid, in the preparation of sp. ætheris nitrosi, Reich found formic acid once only; but in several cases (at least in the collected residues preserved from one to four years) he found oxalic and malic acids, and always saccharic acid. These residues were manufactured into malate of lime, and from this succinic acid was prepared by fermentation with decayed cheese.—*Central Blatt*, No. xxxviii., 1850, p. 606.

ON THE WATERY EXTRACT OF ALOES.

BY F. L. WINCKLER.

According to Winckler, when powdered aloes is rubbed with an equal weight of cold water, it dissolves and assumes the consistence of syrup. If this solution be gradually mixed with more water, the substance of the aloe is decomposed into an easily soluble compound of a large proportion of the bitter principle of aloes, with a small proportion of resin; and another compound consisting of the reversed proportions of these two substances. It is, therefore, possible to control the degree to which the separation of the resin from the bitter matter is to be effected. For perfectly removing all the resin, at least sixty to eighty times the weight of water is required. The bitter principle of aloes devoid of resin is obtained by dissolving aloes in six or eight parts of boiling-water; and then saturating the solution with sulphate of soda; when cold, the solution, which is now free from resin, is poured off from the precipitated sulphate of soda and resin, and evaporated to dryness. From the residue the aloe-bitter is removed by alcohol. It is soluble in water and solutions of salts, and possesses in a high degree all the properties of the aloe-extract. All the extracts prepared according to the Pharmacopœias contain large proportions of resin.—*Central Blatt*, No. xxxvii., 1850, p. 592.

IMPURITIES AND ADULTERATIONS OF IODINE.

BY DR. HERZOG.

The usual characteristics of the purity of iodine are its perfect solubility in alcohol and its volatility by heat; both, however, are very fallible.

The impurities of iodine consist mostly of accidental admixtures, namely, *water*, *chloride of iodine*, *cyanide of iodine*, and *clay* fallen in as lute; but also of intentional adulterations, such as *water*, *chloride of magnesium*, *plumbago*, *coal*, *black oxide of manganese*, *sulphuret of antimony*, *galena*, *sand*, and *clay*.

1. *Water.*—Its proportion amounts sometimes to ten per cent., and is frequently owing to the presence of other substances, *e. g.*, chloride of iodine or chloride of magnesium.

2. *Chloride of Iodine.*—Iodine adulterated with this substance has a strong disagreeably pungent smell of chlorine and iodine, very similar to that of cyanide of iodine. The author considers it remarkable that this adulteration has not hitherto been noticed, since in the preparation of iodine on the large scale metallic chlorides, which might give rise to the formation of chloride of iodine, are not always excluded.

If chloride of iodine be present it is detected by the addition of water, which quickly becomes brownish yellow, and shows by its reaction the presence of hydrochloric acid. Pure iodine, however, dissolves with difficulty.

The chlorine is easily detected by treating the iodine with metallic iron and water, removing the iron by carbonate of potash, saturating with acetic acid, and precipitating the chlorine as chloride of silver.

3. *Cyanide of Iodine.*—The author thinks that the presence of cyanogen is due to the small marine animals which are always unintentionally, or to the larger ones, which are intentionally, mixed up with the sea-plants from which kelp is prepared, and which on being heated form combinations of cyanogen with the carbonate of soda of the ashes. In order to discover cyanogen, the iodine is to be dissolved in pure caustic potash lye, the solution evaporated, and the residue heated to redness, or the iodate of potash decomposed by sulphuretted hydrogen, in order to avoid afterwards all reaction of iodine upon the addition of acids, which may easily interrupt the experiment. The mixed sesquichloride and protochloride of iron is then added, as long as a precipitate takes place. This is redissolved by muriatic acid, and if cyanide of potassium be present a greenish blue or blue residue of ferrocyanide of iron remains behind.

4. *Clay* is not always intentionally added, but is often introduced as lute.

5. *Chloride of Magnesium.*—The author found this once only in some very moist iodine, by shaking it with water, and volatilizing the iodine by heat from the solution. The solution was evaporated to dryness, and on adding water to the residue, a small quantity of white flocculi remained behind; in the liquid, chlorine and magnesium were detected.

The other adulterations above-mentioned the author has never observed, except that with—

6. *Plumbago.*—This is detected by the insolubility in alcohol, by the glittering grey red colour, which appears after drying, the little change and diminution before the blow-pipe, and by its capability of being attracted by the magnet.

7. *Coal* is detected by the glittering black colour, by burning before the blow-pipe, and by the absence of magnetic attraction.

8. *Black oxide of manganese* on being treated with muriatic acid, developes chlorine.

9. *Sulphuret of antimony* is easily detected by chlorine, the iodine, particularly if somewhat moist, becomes, after a short time, reddish brown by

it. Also by solution in alcohol, a residue is left, which on being heated with a few drops of muriatic acid, dissolves for the most part, and is precipitated white by water, and orange red with sulphuretted hydrogen. The blow-pipe also very readily detects the presence of antimony or sulphuret of antimony.

10. *Galena* is easily discovered before the blow-pipe.

11. Another adulteration which is said to have occurred, namely, with *bitartrate of potash*, is also easily detected by its insolubility in alcohol.

As the best mercantile iodine, the author recommends the *iodum raffinatum* or *biraffinatum* of Kahlert, in Brunswick. The *iodum Anglicum* is drier and purer than the *iodum Gallicum*.—*Central Blatt.*, No. xxxix, 1850.

TESTS FOR QUININE.

BY DR. VOGEL, JUN.

According to Brandes, a solution of sulphate of quinine, mixed with chlorine water, assumes, upon the addition of ammonia, an emerald-green colour. Dr. Vogel treated the same solution, mixed with chlorine water, with a concentrated solution of ferro-prussiate of potash. The liquid became dark-red, and, after a few hours, especially in the day-light, green. If potash be added to the liquid treated with chlorine water, the liquid becomes yellow, like sulphur. If instead of chlorine water, a solution of chloride of lime mixed with muriatic acid be employed, a green powder is thrown down. With cinchonine this reaction is not produced.—*Central Blatt.*, No. xxxvii., 1850.

ADULTERATION OF QUINOIDINE.

BY OVERBECK AND WESSEL.

The adulteration of quinoidine with from 40 to 64 per cent. of resin has been observed by Overbeck, Wessel, and many others. This quinoidine is characterised by its brittleness,. It can be easily powdered, without becoming soft, and tastes much less bitter than the unadulterated substance. —*Central Blatt.*, No. xxxviii., 1850, p. 607.

ON THE TWO MODIFICATIONS OF THE OXIDE OF TIN.

BY G. C. WITTSTEIN.

The cause of the differences between the two modifications of the oxide of tin, depends, according to Wittstein, on the difference of the cohesion and of the grouping of the molecules. If the hydrated oxide of tin (stannic acid of Fremy), precipitated by ammonia from the solution of chloride of tin, be immediately, after being washed with cold water, and while still moist, examined by means of a magnifying power of forty linear, the individual particles of the precipitate cannot be recognised, the whole forming rather a delicate homogeneous mass. Only at 130 times magnifying power, the author was able to distinguish the coadjacent particles of a globular or oval form, varying in size. This hydrated oxide of tin is therefore amorphous. A portion of the precipitate having been boiled for half an hour in water, and placed under the microscope, appeared considerably condensed. The particles could then be distinguished when only forty times magnified, and were no longer globular or oval, but had an angular or *crystalline* form. Hydrated oxide of tin, prepared from tin by nitric acid (the meta-stannic acid of Fremy), forty times magnified and boiled, had completely the appearance of the last precipitate, namely, its particles were angular or *crystalline*.

Several cases being known, where one and the same substance stands in different relations to solvents, according to its being amorphous or crystalline (*e. g.* opal and quartz), it may easily be explained why these two hydrates vary in their relations to acids. The oxide prepared with nitric acid is not dissolved in acids, or only with difficulty, because it is more coherent and crystalline, and the oxide precipitated from solutions is easily dissolved, because it is more porous and amorphous. By boiling in water, the latter becomes less soluble in acids; it is now more assimilated to that prepared by nitric acid, having become crystalline. The next cause of this metamorphosis is the heat, and the author is inclined to ascribe to this agent also the greater insolubility of the oxide prepared with nitric acid. This change, so speedily produced by heat. is, however, also effected by a prolonged exposure to a common temperature. The hydrated oxide of tin, which gradually falls down from solutions of chloride or nitrate of the protoxide of tin, dissolves with as much difficulty as that prepared with nitric acid, and is also not amorphous, but crystalline. The oxide of tin becomes still more coherent and more crystalline by heating to redness, when it entirely loses its affinity for acids.

The conclusion which the author draws from these observations is, that every easily soluble oxide of tin is amorphous, or all amorphous oxide of tin is easily soluble—all oxide of tin which is dissolved with difficulty or not at all, is crystalline, or all crystalline oxide of tin is insoluble, or only dissolved with difficulty.—*Buchner's Rep.*, No. xv., 1850.

A NEW REMEDY FOR SHORT-SIGHTEDNESS.

BY DR. TURNBULL.

"A FEW months ago, I observed that persons who are short-sighted, when looking at objects at a distance, partially close their eyelids, for the purpose of overcoming the difficulty they find in discerning them. This action is instinctive: it is a natural effort to adjust the eye to an increased sphere of vision. It is well known that short-sightedness depends not only on convexity of the cornea, but also on convexity of the lens; and having no hope of being enabled to effect any alteration in the structure of the lens, my attention was directed to the iris, which I found to be, in such persons, generally much dilated. It then occurred to me that contraction of the iris has the effect of apparently lengthening the convexity of the cornea, which approaches a circumscribed plane, that permits the rays of light to enter only in a straight line. The effect of this is obvious. The length of vision hereby necessarily becomes increased, and distant objects are brought within its range. It, therefore, struck me, that if we could discover any substance which could be so applied as to contract the iris, one cause of the defect of short-sightedness would be remedied. The result, I am happy to say, has been most satisfactory. In the first instance, I applied the extract of ginger, which was rubbed for five or ten minutes over the whole forehead, with the view of acting upon the branches of the fifth pair of nerves. Afterwards, I substituted a concentrated tincture of ginger, of the strength of one part of ginger to two parts of spirit of wine, decolorised by animal charcoal. The success of this application was remarkable. In many cases it had the effect of doubling the length of vision. In some persons I found the iris was not much dilated, but very torpid. In these cases I applied the concentrated tincture of pepper, made of the same strength, and in the same manner, as the tincture of ginger. This I used until I observed that the iris had obtained a greater power of contraction and dilatation, after which I had again recourse to the tincture of ginger.

"This plan of treatment has been attended with the most signal success, and persons who were extremely short-sighted have very soon been enabled to lay permanently aside their concave glasses. The best method, I may observe, of testing the improvement of the sight during this treatment, is not by taking a printed book, and holding it near, and then at a greater distance from the eyes; this range of vision is much too limited. It is better to fix the attention of the patient upon a distant object, such as the brass key-hole of a door, and by his stepping some paces backwards, so as to place himself at a greater distance from it, he will soon discover the progress he is making."—*Lancet.*

SALE OF POISONS IN FRANCE.

Some time ago, a law was passed for regulating the sale of poisons in France, which required, among other things, that all poisons should be kept in a separate part of the shop, under lock and key. In framing this law, it was of course necessary to specify what are poisons, and this was done without consulting the Pharmaceutical body, who were astonished, on the promulgation of the law, to find a considerable portion of their stock in trade included in the category of poisons, and placed under the new restrictions. A memorial was, in consequence, presented to the government, and the result has been that the former list has been cut down to the following:—

LIST OF POISONS.

Contained in the Schedule of the Decree of the French Republic of July 8, 1850.

Hydrocyanic acid
The poisonous vegetable alkaloids and their salts
Arsenic and its preparations
Belladonna, extract and tincture
Cantharides, entire, in powder or extract
Chloroform
Hemlock, extract and tincture
Cyanide of mercury
Cyanide of potassium
Digitalis, extract and tincture
Tartar emetic
Henbane, extract and tincture
Nicotine
Nitrate of mercury
Opium and its extract
Phosphorus
Ergot of rye
Stramonium, extract and tincture
Corrosive sublimate

ROYAL SOCIETY.

Professor Faraday delivered the Bakerian Lecture on Thursday the 28th of November, when he explained his recent discoveries in reference to the magnetism of gases. He finds that oxygen is magnetic, like iron, and that nitrogen is not affected by the magnetic force, being in this respect in the same condition as a vacuous space. He also finds that the magnetism of oxygen decreases as the temperature of the gas increases, from which circumstance the magnetism of the atmosphere must be subject to constant variations, and it is probable this will be found to account for the variations in the magnetic dip. On account of the late period of the month it is impossible to give more than this brief notice of the communication.

REVIEWS.

Instruction in Chemical Analysis (Qualitative). By Dr. C. R. Fresenius. Third Edition. Edited by J. Lloyd Bullock. London: John Churchill, Princes Street.

This work, having reached the third English edition, does not require a lengthened notice on the present occasion. Its character is fully established as one of the best works, and certainly the most complete, that we possess on this subject. Its very completeness, indeed, is sometimes urged as a defect, for the minuteness with which all the results of the reactions indicated are described, renders it somewhat prolix and perplexing to students who are commencing the study of analysis. To those, however, who have made some progress in the study, and are acquainted with the general outline of the systematic course, minute details comprising every modification which altered circumstances may induce in the looked for results, give increased value to the work, and render it a most efficient guide for the self-taught analyst.

Some inconvenience was experienced in using former editions, from the frequent references made, in the systematic course, from one paragragh to another. This has been to a great extent remedied, in the present edition, by having bold marginal numbers attached to the paragraphs, by which reference is greatly facilitated.

MANUAL OF QUALITATIVE ANALYSIS. By **ROBERT GALLOWAY**, F.C.S. John Churchill.

THIS little work is designed for beginners in the study of analysis. All details relating to the less frequently recurring results are omitted, whilst first principles are familiarly explained, together with the broad features of the generally adopted system of qualitative analysis. The author, however, is not a mere copyist or compiler, for there are some modifications suggested in the mode of operating usually pursued. Thus, in the precipitation of the third group of bases, instead of adding chloride of ammonium, ammonia, and sulphide of ammonium at once, it is recommended, first, to add nitric acid, and then chloride of ammonium and ammonia, by which, alumina, oxide of chromium, peroxide of iron, phosphates of alumina and iron, and the phosphates and oxalates of the alkaline earths, are precipitated; while manganese, nickel, cobalt, and zinc are left in solution, and these are subsequently precipitated with sulphide of ammonium. Then, again, in the precipitation of magnesia, arseniate of ammonia is recommended in the place of phosphate of ammonia or soda. We see in these modifications of the usual process of analysis, as well as in the little Manual in which they are described, much to commend them to favourable consideration.

THE ELEMENTS OF MATERIA MEDICA AND THERAPEUTICS. By **JONATHAN PEREIRA**, M.D., F.R.S. Part 1 of Vol. II.—To be noticed next year.

ERRATA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

DEAR SIR,—In your last number, at page 229, I am made to say that I obtained hydrocyanic acid, containing 2.7 per cent. of real acid, by the new Dublin formula. This is a mistake; the strongest I obtained was 2.48 per cent. The acid of the old Dublin Pharm. is stated by Christison to have contained 3.3 per cent.

At page 216 you say that solutions of the salts of morphia in Edinburgh and Dublin are not of the same strength. I think you have not observed the different composition of the salts of morphia. The solutions named will contain almost exactly the same proportionate quantities of morphia.

I remain, yours, very truly,

Bold Street, Liverpool, Nov. 2, 1850. JOHN ABRAHAM.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

DEAR SIR,—There is a typographical error in my paper on Sp. Æth. Nit. in this month's Journal, which I will thank you to correct in the next number. Instead of acid nitric fʒ, it should be f℥.

I am, Sir, yours truly,

28, *Old Market Street, Bristol, Nov.* 6, 1850. JAMES GRANT.

TO CORRESPONDENTS.

The Adulteration of Isinglass.—We received last month a copy of a printed circular, issued by Messrs. Dawson and Morris, being a lame attempt to exonerate themselves from the charge of adulteration of isinglass which has been proved against them. We did not publish the circular or allude to it, considering the subject settled, and further comment unnecessary. We have now received a letter from Mr. Macord, being a reply to the above circular. For the reason which induced us to omit the circular, we consider it unnecessary to publish the reply. The fraud is proved—what more is wanted?

A Country Druggist.—The subject of the adulteration of milk of sulphur with sulphate of lime has been noticed in this Journal more than once. See vol. i., page 581, and vol. ii., page 517.

Amicus.—Formulæ for Emplastrum Cerati Saponis will be found in vol. iii., pages 36 and 81 of this Journal.

G. W., M.P.S.—Potassium is now always prepared by decomposing carbonate of potash in contact with charcoal in a wrought-iron retort. The details of the process will be found in any work on the Elements of Chemistry.

J. S. (Brighton).—We are unable to suggest any improvements in the formulæ.

Curiosus.—We are not acquainted with the manufacture of waterproof percussion caps.

J. W. (Melrose) recommends the following composition for preventing damp coming through walls. Cut gutta percha into small pieces, and dissolve in oil of turpentine, with moderate heat, to the consistence of painter's varnish. Mix it with ground white lead, and apply the compound with a painter's brush. Two or three coats should be applied. J. W. states that he has tried the above with success in two or three cases.

A Subscriber.—When liquor ammoniæ fort. is ordered in a prescription, the Chemist must use his discretion. In most cases, liq. ammon. P.L. is intended, sometimes the strongest solution. In consequence of the changes in the names, the term is ambiguous.

A Country Member.—A Chemist is not liable to a penalty for recommending a medicine across the counter. A licence is necessary for keeping and using a still.

T. W. W. (Hammersmith).—We are not acquainted with any means of completely disguising the smell of turpentine. Essence of lemon is sometimes added for the purpose.

A Member (Blackburn).—We have no recipe for curling fluid.

A. P. H. (Cheltenham).—The substance thrown down when rectified spirit is added to the expressed juice of taraxacum, has the appearance of soft extract, but consists chiefly of vegetable albumen and other inert constituents of the plant.

J. G. (Clapton).—The author of the production is mad.

X. O. X., *Amator Scientiæ.*—We sent a long letter containing answers to the list of enquiries by post, as requested, which was returned with the memorandum, "not called for."

T. O. C.—Rub down the gum with water and strain.

Medicus.—Teaspoonful is one word. To make it plural, add s.

A Member (Brighton).—Digestive tablets are composed of rhubarb, ginger, and other aromatics, made into the form of a lozenge with sugar.

A Constant Subscriber (Dumfries).—Water gas. See Vol. x., No. 3.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Advertisements to Mr. Churchill, Princes Street, Soho.

Other Communications to the Editor (to the care of Mr. Churchill).

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. IX.—JANUARY 1st, 1851.

HOMŒOPATHY.

> "Diseases are sometimes cured by remedies capable of producing an analogous affection."—HIPPOCRATES.
>
> "Take thou some new infection to the eye,
> And the rank poison of the old will die."—SHAKESPEARE.
>
> "Similia similibus curantur."—HAHNEMANN.

THERE is but a step between the sublime and the ridiculous. The philosopher and the quack alike profess to elucidate truth, but there is this distinction between their methods of proceeding: the philosopher deduces his theories from established facts, the quack builds up his "facts" on a theoretical foundation.

The above aphorism of Hippocrates and the analogous observation of Shakespeare afford evidence of acute and philosophical observation; but the same sentiment distorted by Hahnemann into a supposed universal law of nature, involves an absurdity which is perfectly ridiculous.

The doctrine of infinitesimal doses is another absurdity which defies both proof and contradiction, since no evidence can be deduced from atoms so minute as to elude detection either by microscopic examination, or by the most delicate chemical tests. If it be the case that the potency of a medicine when triturated, *secundum artem*, increases in proportion to its dilution, then it would follow that the maximum intensity is attained at "zero," that is to say, when the quantity is reduced to nothing.

The "*vis medicatrix naturæ*" is the sheet-anchor of homœopaths, and if they had the candour to confess this fact, the ground-work of their theory might admit of demonstration. This, however, would not suit their purpose. The inventor of infinitesimal sugar-plums was an acute observer of human nature, and he knew the value of mystery as a vehicle for imposition. Like the priest who pretended to exhibit a hair from the head of the Virgin Mary, which during forty years he had never seen himself, this arch quack relied on the imagination of his dupes, and suited the size of the dose to the amount of their understanding.

Another artifice of the homœopaths relates to the regulation of the diet, and this is ostensibly founded not on the applicability of the prescribed regimen to the physical state of the patient, but on the alleged interference of certain kinds of food with the action of the medicine.

Thus the infinitesimal sugar-plum is the talisman which rivets the imagination and enchains the reason of the patients—it is the charm which reduces them to insane credulity, and consequent implicit obedience.

When cases arise in which the *vis medicatrix naturæ* is not adequate to the cure of the disease, a variety of tricks are resorted to for the purpose of obtaining the aid of medicine, without unmasking the sugar-plum imposition. Sometimes strong medicines — morphia [*], strychnia, &c.—are administered in appreciable doses, the patient not being aware of the fact. Sometimes patients are *permitted* to take purgatives or other medicines on their own responsibility, the quack pretending to protest against the practice, and administering a globule, professedly to counteract the prejudicial effect. A paste consisting chiefly of aloes has been lately in fashion among the craft. Patients taking cod-liver oil in globules, have, in some instances, been allowed to take the same remedy in ordinary doses, with the assurance, however, that the medicinal effect is attributable to the homœopathic dose, the other acting merely as an article of diet. These and other similar subterfuges may be compared to the evasion of a man who sells a straw and gives away a pamphlet, or to the trick of a conjuror, who pretends to pour wines and liqueurs out of an empty bottle.

Some of the homœopathic practices are no less disgusting than absurd. A friend of ours was lately requested by one of these quacks to prepare a tincture of bugs for internal administration. This he respectfully declined. To such an extent is the doctrine *similia similibus curantur* carried, that " syphiline" is administered to patients suffering under secondary syphilis, and " Blennorrhin," which is gonorrhœal matter manipulated according to the rules of homœopathic confectionary, is mentioned in the Homœopathic Archives[†] as a remedy for gonorrhea and gleet. On the same principle the microscopic itch-insect (*Acarus scabiei*) might be clad in a cuirass of sugar and administered as a cure for the itch. Sulphur, which is the most affectual remedy for this disease, is homœopathically prepared in the form of tincture as follows[‡]:—Five grains of sulphur, previously washed with spirit, are added to 100 drops of spirit, in a well-stopped bottle, which is twice shaken, and allowed to stand in a cold place for twenty-four hours. One drop of the supernatant liquid is diluted with ninety drops of spirit for the first attenuation. This is further diluted (one drop to ninety) to the thirtieth degree!

Jahr's *Nouvelle Pharmacopée Homœopathique*, published at Paris in 1841, contains, in the list of Materia Medica, various disgusting absurdities, among which are *lachesis*, the poison of the rattlesnake; *formica rufa*, the red ant; *aranea diadema*, a species of spider; *rana bufo*, the toad; *lacerta agilis*, the lizard; *scarabæus melontholæ*, the cockchafer; *viverra putorius*, stinking polecat, of which the officinal part is the fœtid secretion from the glands near the anus. The *écrivisses*, or fresh-water crabs, are directed to be pounded ALIVE in a mortar until reduced to a fine paste. This is diluted with about twice its volume of alcohol, then strained, and the liquor preserved for dilution in the usual way. Toads, lizards, cockchafers, and other reptiles and insects are brayed (alive) in the same manner! A nice dose for the fair denizens of Belgravia!

The author of the above work describes (page 290) the administration of physic by *olfaction*. This is done by passing before the nose of the patient three or four globules in a small tube. We have heard of a lady who, having been subjected to this process by her homœopathic doctor, passed the fee before his nose in a similar manner, and then replaced it in her pocket.

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[*] Dr. Taylor has found as much as one-third of a grain of morphia in a powder professedly homœopathic.

[†] Published at Leipsic, 1841.

[‡] Quin's Homœopathic Pharmacopœia.

THE SELF-SUPPORTING DISPENSARIES.

The real nature of these "self-supporting" charities is now, we believe, generally understood. The subject has been fully discussed in the profession in London, with a negative result, and some of the medical journals, both in England and Ireland, have exposed the fallacy of the self-supporting principle, as propounded by the authors of this contradictory contrivance.

Experience has in some instances confirmed this impression. In Banbury, where the experiment has had a fair trial, it was a signal failure. The Dispensary was not supported by those for whose benefit it was originally intended, while a superior class, who could well afford to pay a medical attendant, availed themselves of its advantages. Thus the poor derived no benefit, the medical men were injured, and the profession was degraded.

Those instances which have been adduced as illustrations of success, are, in our opinion, by no means conclusive. It may happen that the accumulation of pence is sufficient to keep the institution in a state of solvency, and to furnish salaries to a limited number of medical attendants. But it does not necessarily follow that the right persons are benefited, nor is it clear that the pence are not obtained at the cost of as many shillings diverted from the legitimate channel.

The possibility of a "self-supporting" dispensary becoming involved in debt, ought not to be left out of the calculation. We have been informed that some of the Members of the Council forming the long list to which we alluded last month, were startled at finding themselves in this prominent position. During the railway mania, many gentlemen were equally surprised to find their names figuring on provisional committees in which they had taken no part, and were no less annoyed when a shower of writs and lawyers' letters informed them for the first time as to the nature of their liability.

We trust the provisional committee of this gigantic retail joint-stock Apothecaries' Company, will see the prudence of guarding themselves against similar annoyance.

THE GREAT EXHIBITION.—DRUGS AND CHEMICALS.

So far as the Commissioners are enabled to judge at present, Chemistry and Pharmacy are likely to be well represented. The entire space of counter and floor allotted to the metropolitan exhibitors of all classes, is 72,082 square feet, and of this 906 square feet are to be devoted to chemical and pharmaceutical processes and products. In the first instance, the applications exceeded the space allotted, but as some of the exhibitors have had a smaller amount of space granted than was applied for, it has been found practicable to introduce some additional articles so as to fill up a few links in the series of chemical products, which manufacturers on application from the Commissioners readily undertook to supply.

To ensure a complete collection of drugs, &c., a list has been printed, under the superintendence of Dr. Pereira, and when the period for sending in specimens is further advanced, the Commissioners will compare this list with the specimens in hand, and take measures for completing the series.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES
(*Continued*).

ELECTED IN SEPTEMBER, OCTOBER, NOVEMBER, AND DECEMBER.

MEMBERS.

BATH	Bennett, Thomas	Bridge Street
BARNETT	Huggins, George T.	High Street
BRIGHTON	Garnham, Barrington	22, London Road
BRISTOL	Hathaway, Richard J.	27, Clare Street
	Poynton, Edward H.	27, Clare Street
DEPTFORD	Balls, George	5, Hamilton Place
EWELL	Jackson, William R. P.	High Street
FARNWORTH	Brimelow, Thomas	
GRAVESEND	Burbidge, Thomas	1, Harmer Street
IPSWICH	Dunger, John	Fore St., St. Clement's
JERSEY	Aubin, James	1, Halkett Pl., St. Heliers
KINGSTON-ON-THAMES	Whinfield, William H.	Heathen Street
LONDON	Beaton, John	174, Shoreditch
	Clark, John	Church Street, Hackney
	Dickinson, William	16, Cambridge Street, Hyde Park
	*Gerard, Philip A.	390, Strand
	Goff, Henry W.	7, Prospect Pl., Kingsland
MANCHESTER	Wilkinson, William	38, Gartside Street
NEWARK	March, William	Market Place
PETHERTON	Wellington, Frederic G. N.	St. James's Street
ROCHDALE	Baker, Philip P.	9, South Parade
ROMSEY	Slater, William H.	Market Place
SALFORD	Pickup, Varey	33, White Cross Bank

MAJOR EXAMINATIONS.

Copney, William	London
Marshall, John	Ditto

MINOR EXAMINATIONS.

Baly, Nathan	Warwick
Groves, Wellington Edwards	Blandford
Groves, Thomas Bennett	Weymouth
Higgins, Tom Sellers	Huddersfield
Jennings, John E.	Bath
Warner, John	London
Wood, George Emilius	Ditto

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Attfield, John	Mr. Smith	Walworth
Day, Henry	Mr. Beaton	London
Dyer, Alfred	Mr. Blandford	Ditto
Franklyn, Thomas	Mr. Galliers	Ditto
Gibbons, George	Mr. Giles	Bristol
Hallam, Charles M.	Mr. Watkins	Walsall
Harvey, Charles	Mr. Barron	London
Hill, William R.	Mr. Tylee	Bath
Humphries, Charles	Mr. Watkins	Walsall
Lankester, Joseph A.	Mr. Kendall	Stratford-on-Avon
Lenton, William H.	Mr. Foster	Hull
Oppenheim, Lewis	Mr. Goodger	London
Peterson, Edwin	Messrs. Ferris & Co.	Bristol
Player, Jacob H.	Mr. Coombs	Bedford
Shepheard, Thomas	Mr. Gulliver	Lutterworth
Simmons, George	Mr. Taylor	Godalming
Squire, William	Mr. Squire	London
Sutton, John	Mr. Attwater	South Molton

PHARMACEUTICAL MEETING,

Wednesday, December 11, 1850.

MR. INCE, PRESIDENT, IN THE CHAIR.

DONATIONS TO THE MUSEUM.

The following donations were announced :

From Dr. Pereira, specimen of Nag-Kassar. (See notice below.)

From Mr. Daniel Hanbury, Seeds of *Strychnos potatorum*, the Clearing Nuts of India.—Specimen of false Calumba, imported as Calumba wood. (See notice below.)

NOTICE OF NAG-KASSAR (*MESUA FERREA*, LINN.).

BY JONATHAN PEREIRA, M.D., F.R.S.

Under the name of *Nag-kassar*, there have recently been imported into London the flower-buds of *Mesua ferrea*, a guttiferous plant, growing in Java, Amboyna, and Bengal.

Nag-kassar.
Nat. size.)

The buds are about the size of pepper corns, and are supported each on a pedicel of about an inch in length. Their colour is orange-brown, or that of cinnamon; their odour is very fragrant, and like that of violets or orris root. It is stated by Dr. Roxburgh (*Flora Indica*, vol. ii. p. 605) that the grandees of Ava stuff their pillows with the dried anthers, on account of their fragrance. The flowers and leaves are said by Dr. O. Shaughnessy to be used in Bengal as antidotes to snake poisons.

Sir Wm. Jones (*Asiatic Researches*, vol. iv., p. 295, 1795) gives, as the proper Indian name of the plant, *Nágacesara*, its vulgar name being *Nagasar*. By other writers on Indian botany the name is variously spelled *Nagsara* or *Nagkesar*.

The plant is figured by Rheede (*Hort. Malabaricus*, 3 p. 63, t. 53), who calls it *Balutta-tsiampacam, seu Castanea Rosea Indica*. It is also noticed by our countryman Ray (*Historia Plantarum*, p. 1680), who says it has an odour of violets and roses.

On account of its great fragrancy it might be valuable as a perfume.

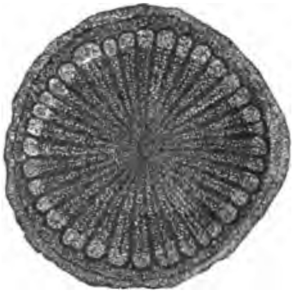
ON AN ARTICLE IMPORTED AS CALUMBA WOOD,

SUPPOSED TO BE THE PRODUCE OF A *MENISPERMUM*.

BY DANIEL HANBURY.

Some months since there was imported into London from the island of Ceylon, under the name of *Calumba Wood*, a quantity of woody stems cut into lengths of from twelve to eighteen inches, and varying in diameter from one to four inches. The article was not wholly unknown to druggists, a small quantity having appeared in the market some years before.

This wood, which is covered with a thin, pale, corky bark, is of a



Transverse Section of Calumba Wood. (Natural size.)
This cut has been prepared from an impression taken from the wood itself.

bright greenish yellow colour, slightly bitter taste, and devoid of odour. A transverse section shows a small compact medulla, surrounded by very porous woody tissue, traversed by remarkably distinct medullary rays, each of which divides at its outer extremity into two layers, which diverge and form arches by uniting with the corresponding prolongations of the adjoining rays. Between some of the principal rays, smaller imperfect rays are occasionally observable. The heads of the arches are occupied by a loose, shrunken tissue, very different from the mature wood, with which, however, it is in immediate contact. There is no appearance of concentric zones.

This peculiarity of structure rendered it probable that the Calumba wood might be afforded by some plant of one of the three natural orders, *Piperaceæ*, *Aristolochiaceæ*, or *Menispermaceæ*. From the first of these it appears to be separated by the absence of a jointed structure, volatile acrid matter, and some other peculiarities characteristic of the pepper tribe, while from the diagnostic characters of the wood of the two remaining orders given by Decaisne (*Comptes Rendus*, vol. v., p. 392), an origin among the *Menispermaceæ* was inferred.

Upon the supposition that this inference was correct, reference was made to Roxburgh's *Flora Indica*, from which it appears (p. 809), as well as from the statement of Colebrooke (*Linnean Trans.*, vol. xiii., p. 65) and Ainslie (*Materia Indica*, vol. ii., p. 461) that the bitter yellow wood of the *Menispermum fenestratum*, Gærtn. is employed as a tonic by the natives of Ceylon; and that, moreover, this plant has been confounded by Europeans with the true Calumba, which has not been discovered in that island. It will, however, be best to give the statement of Roxburgh, which is as follows:—

> "*Menispermum fenestratum*, *Gært. Sem.* 1, p. 219, t. 46, f. 5. * * Trunk and large branches scandent, stout, thick and ligneous. The wood of a deep lively yellow colour, and of a pleasant, bitter taste. * * * The above description was taken from specimens sent to me from Ceylon by General Macdowall, who at the same time, gave me the following account of the plant.
>
> 'I have lately been at some trouble to discover whether or not the true *Colombo root* is a native of our soil, and shall probably remain in doubt until I am furnished with your opinion. I now forward a specimen of the root, and some of the leaves and flowers which grow from the stem of the branch. It is a very strong creeper, and the natives make use of it to tie their cattle, and for other purposes of husbandry, where ropes are necessary.
>
> 'Should this prove the celebrated *Colombo root*, I believe a great quantity of it might be collected and sent to Europe, where it is in great request, but I can scarcely presume to think, after all the labour of the learned Thunberg in particular, who denies its existence here, that I shall be so fortunate as to discover it. Your opinion shall be decisive with me, and although it may not be that valuable medicine, I suppose it yet may

possess many excellent qualities. It is called by the Cingalese *Venivel-getta* or *Bangwel-getta*; English, the knotted plant. It is in repute among the inhabitants, who slice it into pieces, and after having steeped it in water several hours, swallow it with the liquid. They recommend it as an excellent stomachic.

'When the seed ripens, I shall have the pleasure of sending you some of it at all events.

'I have sent you a pretty large bit of the root, sawed from the centre of a knot, that you may make an experiment upon it.'

"*Note.*—This is certainly not the *Colombo Root* of our *Materia Medica.—R.*"

The Cingalese name *Venivel-getta*, so nearly corresponds with that of *Weni-wœla-gœta* applied by Moon (*Catalogue of Indigenous and Exotic Plants growing in Ceylon, Colombo.* 1821. p. 70) to a plant which he calls *Cissampelos convolvulacea*, var. *β*, whose root he states to be medicinal, that I have been led to suspect that Moon's plant may prove identical with the *Menispermum fenestratum* of Roxburgh.

It is however evident that we are without any *proof* that Calumba wood is produced by *M. fenestratum*, and although from the foregoing statement of Roxburgh it may appear probable that such is the case, yet, as many plants of this genus are employed medicinally in the countries of which they are natives, I think it must be concluded that there is at present by no means sufficient evidence to decide to which species it should be assigned.

Dr. Pereira (to whose valuable assistance on this and on many other occasions I am greatly indebted) has shown me a curious old tract, entitled, "*Some Observations made upon the Calumba Wood, otherwise called Calumback, imported from the Indies: shewing its admirable virtues in curing the Gout, and easing all sorts of Rhumatical Pains. Written by a Doctor of Physick in the Countrey, to the President of the College of Physicians in London.*" London 1694. But as this author gives no description of the wood, it is not possible to say to what substance he refers, though it is likely that the Calambac, or Aloes Wood of the old pharmacologists, may have been intended.

As the Calumba wood recently imported did not meet with a ready sale, a quantity of it was sawed into discs of about a sixth of an inch in thickness, and in this state offered as Calumba *root!* The appearance of these discs is so entirely different from that of genuine Calumba root, that there seems but little danger of their being purchased in mistake, at least in this country. The smoothness of the sawed surfaces, hardness and peculiar ligneous structure, together with the absence of starch, are quite sufficient to distinguish this drug from the true Calumba root.

London, 16*th of* 12*th month*, 1850.

PROPOSED ANTIDOTE FOR SNAKE POISON.

Specimens of the seeds and fruit of the CEDRON, produce of *Simaba Cedron*, from Panama, in South America, were laid before the Meeting by Dr. Pereira, and extracts were read from a paper by Sir W. J. Hooker describing their reputed virtues as an antidote against snake-poison. (See page 344.)

ON TRUE OIL OF ORIGANUM.

BY DANIEL HANBURY.

In a recent number of the Pharmaceutical Transactions*, I endeavoured to prove that the article sold in this country as oil of origanum is, in reality, the oil of thyme (*Thymus vulgaris*), under which latter name it is imported from the south of France. I further stated, that so far as my observations extended, true oil of origanum was unknown in English commerce.

As it appeared desirable to have an authentic specimen of oil of origanum for comparison, a quantity of the herb was procured and distilled with water in the ordinary way. The plant, which was chiefly collected in the neighbourhood of Sheerness, was quite fresh, and very fully in flower when submitted to distillation. It afforded an exceedingly small amount of yellow oil, seventy pounds producing scarcely an ounce. This small produce may in part be attributed to the coolness and humidity of the weather for some time before the plant was collected, as it is evident from the following passage in Brande's *Dictionary of Materia Medica*, that a much larger amount of oil is usually obtained. This author states, "the average produce of essential oil from this herb [origanum] is one pound from two hundred weight; but it varies exceedingly with the season and culture of the plant."

Contrasted with oil of thyme, oil of origanum is distinguished by the following characters:—

1. Odour, which is somewhat analogous to that of oil of peppermint, and entirely dissimilar from that of oil of thyme.
2. Colour, which in oil of origanum is bright yellow, while the ordinary kind of oil of thyme is of a more or less deep reddish-brown.

The specific gravity of the two oils is so nearly alike, as to afford no distinctive criterion. That of oil of origanum is .8854, of oil of thyme (average of three samples) .8934, at 62° Fahr.

London, 11*th of* 11*th month*, 1850.

POISONOUS PROPERTIES OF SULPHITE OF LEAD.

Mr. Greaves, at a previous Meeting of the Society (see page 265), gave an account of the action of sulphite of lead on dogs. Three dogs had been put under treatment; to one the sulphite of lead was daily administered in the food, to another it was both administered internally and applied by friction to the skin, and to the third it was administered by external application only. The report of the two first cases had been given at a former Meeting; but the poison had not then taken effect in the third case. The result in this last case was communicated on the present occasion.

After a period of thirty days, during which the salt was applied, the dog died with confirmed symptoms of poisoning. For some time previous to his death he lost his appetite, and became completely emaciated; and during the last day or two of his existence he was affected with paralysis, so as to be unable to stand. Lead was found in the liver and other parts of the organism after death.

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* *Vide* vol. x., p. 6.

ADDITIONAL OBSERVATIONS ON DUTCH CAKE LITMUS.

BY JONATHAN PEREIRA, M.D., F.R.S.

On the 13th of June, 1849, I communicated to the Pharmaceutical Society some information respecting the colouring matter of Dutch cake litmus.

I stated, and in fact demonstrated, to the Society that the Dutch cake litmus found in English commerce contained indigo. My experiments were made on samples procured from the best sources in this country; and one of the specimens on which I operated was, in fact, given to me by an experienced dealer in chemicals as a sample of very fine litmus.

Some time afterwards I received from Dr. J. E. de Vry, Lecturer on Chemistry and Pharmacy in the Medical School of Rotterdam, a sample of litmus devoid of indigo. In the letter which accompanied the specimen, Dr. de Vry says, "I send you a sample of Dutch cake litmus of good manufacture. You will find that it contains not a trace of indigo. It is the inferior qualities only which are mixed with a small quantity of indigo to give them a better appearance. I suppose the cake litmus which you have described in the Pharmaceutical Journal for July, 1849, must have been of such a quality. Your result, therefore, was right; but not so your application to Dutch litmus in general."

The specimen of litmus sent me by Dr. de Vry (and which is now laid before the Pharmaceutical Society) differs entirely in appearance from the litmus usually found in English commerce. The cakes are twice as large, and have not that deep blue colour which the ordinary Dutch litmus of English commerce always possesses. In fact, judging from external appearance only, it would, by most English dealers, be regarded as of inferior quality. I cannot, however, detect any indigo in it. On showing it to Mr. Daniel Hanbury, he recognized it as agreeing with a sample of litmus received by Messrs. Allen and Co., from Amsterdam, in 1846; and I have subsequently received from him the following note relating to it:—

London, 7th of 12th mo., 1850.

My dear Dr. Pereira,—Some months ago I was favoured by thee with the sight of a specimen of litmus said to be free from indigo, which thou hadst recently received from Holland. It was in much larger cakes than the ordinary kind, and of not nearly so fine and deep a blue colour. This induced me to examine two samples of litmus received by our house from Amsterdam in 1846, one of which agreed in its characters with that above-mentioned, while the other was of the usual sort, and of excellent quality.

1. The first of these, which I have since called *litmus without indigo*, afforded no crystals of indigo on being carefully heated. Its aqueous solution was of the usual intense purple, and the residuum when deprived of all the colour cold water would extract, was of a fine deep blue colour.

2. The second sample, *litmus containing indigo*, on being heated in a capsule, afforded the small copper-coloured crystals so characteristic of indigo. The aqueous solution possessed nearly the same amount of colour as the other, and of almost the same tint. The residuum was also deep blue. Neither Prussian blue nor cobalt could be detected in either sample.

The remarkable point, however, in the history of these samples, is, that the value of the litmus in large cakes (No. 1) is so much greater than that in small cakes (No. 2) the difference in favour of the former amounting to more than 50 per cent.

It is no easy matter to say what is the cause of this singular variation in price, as the *cheaper* litmus is of *better* appearance, and affords an amount of colour of similar richness, very nearly equal in intensity to that of the other sort. Almost the only difference that could be detected in these two samples (excepting the absence of indigo in one), was, that the residuum of No. 1, when coloured with an acid, was of a finer red than that of No. 2 similarly treated. This, doubtless, arose from the indigo in the latter partially obscuring the red colour.

Accompanying these samples, which were from one of the most respectable litmus manufacturers at Amsterdam, our correspondent sent the price current of another maker, which I enclose for thy inspection. It offers no fewer than twenty-three different qualities of litmus, the cheapest of which is but a ninth part of the value of the most expensive. We were however informed (as we might indeed have easily supposed) that several of the lower qualities of this manufacturer were far from genuine.

I remain, very respectfully thine,

DANIEL HANBURY.

The price current referred to is that of Jan Dekker, of Wormerveer, in Holland. I, therefore, wrote to Mr. Dekker, requesting samples of the different qualities mentioned in his price current; and in November last I received from him specimens of nineteen sorts, being the only qualities he then had in stock. Subjoined is a copy of his price current, with the prices of the different qualities sent to me. I have also added in brackets the prices of these and other sorts contained in the price current sent to Messrs. Allen and Co. in 1846.

Lakmoes-Fabryk van Jan Dekker te Wormerveer.

PRYS COURANT.

	per 50 N. lb.		per 50 N. lb.
6 A	*f* [110]	H	*f* 38
5 A	" [100]	J	" 35
4 A	" [90]	K	" 30
3 A	" 85	LL	" 27
2 A	" 75	L	" 25
A	" 70	M	" 23
B	" 65	N	" 21
C	" 63	O	" 18
D	" 58	P	" 16
E	" 53	Q	" 14
F	" 48	R	" [12]
G	" 43		

In Mr. Hanbury's price current, the qualities "L to R" are said by their correspondent not to be genuine.

The cakes of all the nineteen sorts sent me by Mr. Dekker agree in size with each other, and with those met with as English commerce. But what appears to me extraordinary is the great number of qualities kept by the Dutch manufacturers. I infer from this circumstance that litmus is used in Holland for other purposes than that for which it is employed in England. Here it is exclusively used as a test or re-agent, and the consumption of it is consequently very small. Another circumstance deserving of notice is the great difference in the price of the several qualities. Thus, of the nineteen sorts sent me by Mr. Dekker (among which are not included the finest and most inferior sorts) the one marked "3 A," is more than six times the price of the one marked "Q." This fact is the more remarkable from the circumstance to which Mr. D. Hanbury has alluded, that between the high and low priced sorts there is not a difference in the richness and intensity of the colour corresponding to the difference in their commercial value.

In reply to some questions which I put to Dr. de Vry respecting the manufacture of Dutch litmus, this gentleman informs me that "different species of Roccella from the Mediterranean, the Canary Islands, &c., are ground, and the powder mixed with weed-ashes and water, to make a pasty mixture, which is allowed to ferment. After some time putrid urine and good American potash are added to the mixture. When the paste has assumed a good blue colour, it is formed into quadrangular cakes, which are dried and sold, or when they are of an inferior quality are shaken with some indigo powder or litmus powder of superior quality." "It is very difficult," adds Dr. de Vry, "to obtain accurate information about this manufacture, which is kept very secret. The makers say that they can use the urine of men only, and not that of women. This urine is sold in some benevolent institutions, where old people are maintained by public charity. Litmus is made during the summer only, and its manufacture appears to be affected by the state of the weather; for the makers are much afraid of thunder, so it would seem that the electricity of the air has some influence over the process."

In reply to a question which I put to Dr. de Vry as to the use made of turnsole rags (*tournsol en drapeaux*) which are imported into Holland from France, and of which an interesting notice was published by Mr. Daniel Hanbury in the Pharmaceutical Journal for January, 1850, Dr. de Vry observes, "The *tournsol en drapeaux*, imported from France into Holland, is used to colour our red cheeses, of which some millions are exported. These cheeses have the form of a large cannon-ball, and weigh three or four pounds each. The makers believe that the red colouring matter preserves them."

THE NEW DUBLIN PHARMACOPŒIA.

The **Chairman** stated that the discussion, which had been adjourned from the previous Meeting, would now be renewed. He inquired if Mr. **Squire** had any further observations to offer on the subject of his communication?

Mr. **Squire** would not trouble the Meeting with any further remarks of his own, but believed Mr. Griffin was prepared to explain his views of the best mode of preparing diluted acids, alkaline solutions, and other liquids of a strictly chemical nature, for use in Pharmacy, and to suggest certain alterations in reference to weights and measures, which had a direct bearing on the subject under discussion, and he therefore begged to introduce Mr. Griffin to the Meeting.

ON THE USE OF CENTIGRADE TESTING IN PHARMACY.

BY JOHN JOSEPH GRIFFIN, F.C.S.

The objects of this paper are, to show the use of Centigrade Testing in the examination of the solutions of the acids and alcalies that are employed in Pharmacy; to point out easy and accurate methods of preparing such solutions of any required strength; to urge reasons for a greater simplicity and uniformity in the standards for acids and alcalies prescribed in the three British Pharmacopœias.

Comparative Strength of the Solutions of Acids and Alcalies prescribed in the three existing British Pharmacopœias.

L London, 1836. E Edinburgh, 1841. D Dublin, 1850.

		Specific gravity.	Approximate Chemical Strength.
DILUTE MINERAL ACIDS.			
Diluted sulphuric acid	L	1.1132 ?	212
Ditto	E	1.09	166
Ditto	D	1.084	155
Diluted muriatic acid	L	1.04 ?	134
Ditto	E	1.05	168
Ditto	D	1.045	150
Diluted nitric acid	L	1.08 ?	130
Ditto	E	1.077	125
Ditto	D	1.092	150
CONCENTRATED MINERAL ACIDS.			
Sulphuric acid	L	1.845	2100
Ditto commercial	E	1.84	
Ditto purum	E	1.845	
Ditto	D	1.846	
Muriatic acid	L	1.16	598
Ditto	E	1.18	658
Ditto, purum	E	1.17	617
Ditto	D	1.176	642
Nitric acid	L	1.5	1250
Ditto	E	1.5	1250
Ditto	E	1.39	790
Ditto	E	1.38	757
Ditto	E	1.28	500
Ditto	D	1.5	1250
ACETIC ACID.			
Acetic acid	L	1.048	320
Distilled vinegar	L	1.0085 ?	55
Acetic acid commonly	E	1.063	925
Ditto to	E	1.065	915
Ditto not above	E	1.0685	900
Pyroligneous acid	E	1.034	240
British vinegar from	E	1.006	35
Ditto to	E	1.019	120
Distilled vinegar	E	1.005	30
French vinegar from	E	1.014	83
Ditto to	E	1.022	140
Acetic acid, glacial	D	1.065	915
Ditto strong	D	1.066	540
Ditto dilute	D	1.006	35
Ditto commercial	D	1.044	300
ALCALIES.			
Diluted ammonia	L	.96	320
Ditto	E	.96	320
Ditto	D	.95	400
Strong ammonia	L	.882	944
Ditto	E	.88	960
Ditto	D	.9	800
Caustic potash	L	1.063	66
Ditto	E	1.072	75
Ditto	D	1.068	71
Caustic soda	D	1.056	75
Carbonate of potash	L	1.473	530
Ditto	D	1.31	320
Carbonate of soda	D	1.026	28

The Chemical Strength of Acids and Alcalies a more important character than their Specific Gravity.—The chemical strength, quoted in the last column of the foregoing Table, expresses the saturating power of equal measures of the respective solutions. Thus, diluted nitric acid of sp. gr. 1.092, the chemical strength of which is 150, will saturate twice its bulk of caustic potash of sp. gr. 1.072, the chemical strength of which is 75. I propose to indicate the comparative chemical strength of solutions by the term DEGREE, or by the symbol °. Thus, Nitric acid of 150° will indicate the acid of sp. gr. 1.092, and Potash of 75° will indicate that solution, the sp. gr. of which is 1.072. Acids and alcalies of the *same* DEGREE, are of equal chemical strength, measure for measure.

The fact, that the Specific Gravity of a chemical solution is a character of inferior importance to its Chemical Degree, will be best demonstrated by a few examples:—

a. The specific gravity of the diluted ammonia of the London and Edinburgh Pharmacopœias is .96, while that of the Dublin Pharmacopœia is .95. There does not appear to be much difference between these numbers. The *expressions* differ only about one per cent. But sp. gr. .96 indicates a solution of ammonia, the chemical strength (or degree) of which is 320, whereas sp. gr. .95 indicates a solution the strength of which is 400. While, therefore, the densities differ as 96 to 95, the degrees differ as 4 to 5.

b. I received recently an estimate from a manufacturing Chemist in London, of which the following is a copy:—

"Our Price for Nitric Acid,
1360 is *5d.* per ℔.
1425 is 10*d.* per ℔.
Intermediate strengths in proportion."

Now the degree of nitric acid of sp. gr. 1.360 is 700, and that of acid of sp. gr. 1.425 is 900, and since 5 : 10 = 7 : 14, the price demanded for the stronger acid was one-third too high.

c. The glacial acetic acid of the Dublin Pharmacopœia has a sp. gr. of 1.065, and the acid of the next strength is directed to be made by mixing six measures of the glacial acid with four measures of water. The sp. gr. of the resulting solution is 1.066. This difference of sp. gr. is less than one in a thousand, a difference absolutely inappreciable by the hydrometer—and, indeed, by all the means of determining densities usually at the command of the Pharmaceutist. The specific gravity is consequently useless as a discriminating character. At the same time, the chemical degree of this acid changes during the dilution from 915 to 540, a difference so remarkable, in comparison with the slight change of density, that I will add a few words to show the progress of the change that occurs.

The strongest acetic acid that can be prepared at the temperature of 62° F. has a specific gravity of 1.058286. Its degree is 955. When this acid is diluted with a *little* water its density *increases*, while its strength *decreases*. When more water is added, the density as well as the strength decreases.

At specific	gravity	1.058286	its degree is	955
"	"	1.065	"	915
"	"	1.074428	"	800
"	"	1.066	"	540
"	"	1.044043	"	300
"	"	1.016343	"	100

Comparative Strength of the Solutions of Acids and Alcalies prescribed in the three existing British Pharmacopœias.

L LONDON, 1836. E EDINBURGH, 1841. D DUBLIN, 1850.

		Specific gravity.	Approximate Chemical Strength.
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Ditto	E	1.05	168
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Ditto	E	1.5	1250
Ditto	E	1.39	790
Ditto	E	1.38	757
Ditto	E	1.28	500
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British vinegar from	E	1.006	35
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Distilled vinegar	E	1.005	30
French vinegar from	E	1.014	83
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Ditto	E	1.072	75
Ditto	D	1.068	71
Caustic soda	D	1.056	75
Carbonate of potash	L	1.473	530
Ditto	D	1.31	320
Carbonate of soda	D	1.026	28

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Now [illegible]

simplification of the processes of testing and adjusting the strength of the various liquors.

On Centigrade Testing by means of Equivalent Test Liquors.—All who have mastered the elements of theoretical chemistry know, that the *power* of a chemical solution depends upon the *number* of atoms or equivalents it contains, and not upon the *absolute weight* of those atoms. Diluted nitric acid of 300° is twice as strong as diluted sulphuric acid of 150°, because there are twice as many chemical atoms present in it, not because the atoms of the nitric acid weigh twice as much as those of the sulphuric acid. Chemical solutions of *Equivalent strength*, or, what is the same thing, of the *same Degree*, must contain the same number of chemical atoms. The art of Centigrade Testing depends upon the preparation and use of chemical solutions of given degrees of strength, which subject I now proceed to explain.

SYSTEM OF DECIMAL MEASURES.—As the operations of Centigrade Testing are much facilitated when the calculations they require are made decimally, I begin with an explanation of a system, by which the imperial English gallon is divided into decimal measures.

Temperature, 62° F.; Barometer, 30 inches; Weight, avoirdupois.

Imperial grains. Water at 62° Fah.	Decimal Measures.*
70000	Gallon
7000	Decigallon
700	Centigallon
70	Milligallon
7	Septem
1	Grain

Comparative Measures.
1 Quart............... = 2500 Septems
1 Pint .... = 1250 "
1 Fluid ounce ...... = 62.5 "
1 Cubic inch......... = 36.06543 "
1 Centimeter Cube = 2.2 "

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* It forms no part of my present proposal to introduce *Decimal* WEIGHTS as well as *Measures;* but I may point out that this plan of dividing our Measures is capable of affording also a system of Decimal Weights. I shall sketch the plan in a Table, but without attaching any importance to the *names* given to the weights.

Grains of Water, at 62° Fah.	Decimal Measures.	Decimal Weights.
7000000	?	Ton
700000	?	Hundred weight
70000	Gallon	Stone
7000	Decigallon	Pound (Avoirdupois)
700	Centigallon	Ounce, or Decipound
70	Milligallon	Dram, or Centipound
7	Septem	Septem
1	Grain	Grain

If the grain were abolished, and the weight of seven grains made *unity*, the system would be strictly decimal.

Test Atoms.—The *atomic weights* of chemical substances, taken according to the scale where oxygen is 100, and weighed in *English grains*, constitute what I called *test atoms*. The following Table contains the test atoms of the substances referred to in this paper:—

Sulphuric acid	501.165	grains
Muriatic acid	455.13	"
Nitric acid	677.036	"
Acetic acid	643.19	"
Ammonia	212.5	"
Potash	589.916	"
Potash, carbonate	866.354	"
Soda	390.897	"
Soda, carbonate	667.335	"
Nitrate of silver	2128.643	"
Oxygen	100.000	"

Standard Test Solutions.—When one test atom of any substance is dissolved in water, and the solution is diluted at the temperature of 62° Fahr., till it occupies the bulk of a decigallon, it constitutes a solution of one hundred degrees (100°). The *absolute weight* of the anhydrous substance is of no consequence, but there must be as much of it as is represented by the atomic weight weighed in English grains, the series of atomic weights being on the scale where oxygen is fixed at 100.

We have here the means of procuring a full explanation of the precise strengths of the officinal acids and alcalies recommended for the adoption of the Colleges:—

Sulphuric acid of 150° will contain $1\frac{1}{2} \times 501.165 = 751.747$ grains of anhydrous sulphuric acid in a decigallon of solution.

Ammonia of 300° will contain $3 \times 212.5 = 637.5$ grains of anhydrous ammonia in a decigallon.

The *degree* of every liquor, divided by 100, and multiplied by the test atom, will give the number of grains of the anhydrous substance present in a decigallon of the solution. That number, multiplied by 10, will give the number of grains contained in a gallon, and this, divided by 7000, will give the weight of the anhydrous substance *in avoirdupois pounds*.

Thus, the degree of the strongest ammonia is 1000.

$$\text{Now } \frac{1000}{100} \times 212.5 = 2125 \text{ grains in a decigallon.}$$

$$2125 \times 10 = 21250 \text{ grains in a gallon.}$$

$$\frac{21250}{7000} = 3 \text{ lbs. } 250 \text{ grains of anhydrous ammonia in a gallon.}$$

Processes of Testing.—I shall now briefly describe the Processes by which the *formation* of liquors of the strengths above described, and the *testing* of such liquors, are to be regulated. In doing this, I shall confine myself as closely as possible to what relates to the *principles* of the method, leaving the *details of manipulation* for treatment elsewhere.

The number of liquors that are required to test all the acids, is only one—Ammonia of 50°. The number of liquors required to test the alcalies, is also one—a Mineral Acid of 100°. But as we cannot weigh out a test atom of an anhydrous acid,or half a test atom of anhydrous ammonia, to be dissolved in water to form these test-liquors, we are forced to prepare them by *indirect methods*, which require several additional test liquors.

Preparation of Silver Test of 10°.—Dissolve 212.864 grains of pure crystallized nitrate of silver in six or eight ounces of distilled water, in a bottle graduated to hold a decigallon when filled up to a mark in the neck. When the salt is dissolved, *nearly* fill the measure with water, bring the solution to the temperature of 62 Fah., and then add water to complete the decigallon. The strength of this solution is 10°. 150 measures of it precipitate all the chlorine in 10 measures of muriatic acid of 150. It is therefore a test for the accuracy of the Degree of that acid.

Preparation of Soda Test of 100°.—Prepare a decigallon of solution containing 667.335 grains of pure anhydrous carbonate of soda. This liquor will have the strength of 100°.

As a solution of 100 has two-thirds of the chemical strength of a solution of 150°, it follows that 150 measures of this soda test will be exactly neutralised by 100 measures of any of the acids of 150°.

Preparation of Acids of given strength.—Ten measures of the silver test and *one* measure of the soda test, have exactly the same action on an equivalent quantity of pure muriatic acid.

a. Consequently, if you dilute muriatic acid till it is equal, measure for measure, to the soda test, and until one measure of it precipitates all the silver contained in ten measures of the silver test, it will be muriatic acid of 100°.

b. But if you dilute it only till 100 measures of it are equal in chemical strength to 150 measures of the soda test, and if you then find that *one* measure of it will precipitate all the silver contained in *fifteen* measures of the silver test, the strength of that muriatic acid will be 150°.

c. If on the contrary, you dilute the muriatic acid to a still greater degree, and stop at the point where 100 measures of it will saturate only 50 measures of the soda test, and one measure of it will precipitate all the silver from only five measures of the silver test, the strength of that acid will be 50°.

These examples prove that with these tests, we can bring the acids to any degree of strength we desire. I have instanced muriatic acid because we have a double test for it; but with the soda test alone all the mineral acids can be tested and adjusted to any required Degree.

I have said, that if you dilute muriatic acid to such and such an extent, certain results are produced. I proceed now to answer a question that will very naturally be asked,—In what manner can these respective stages of dilution be readily and certainly reached?

a. The first step in the process is to ascertain approximately the degree of your concentrated acid. What I have to say on this head applies equally to the three mineral acids. Mix one septem of the acid with 100 septems of water and a few drops of litmus. Heat the mixture nearly to the boiling point. Fill your alcalimeter, which must be graduated into septems, with soda test of 100°, and ascertain *how many septems* are required to neutralise the *one septem* of the concentrated acid. That number of septems expresses the number of Test Atoms of anhydrous acid contained in a decigallon of the concentrated acid. Multiplied by 100, it expresses the Degree of the acid. The following Table represents what must occur in an experiment of this kind:—

Quantity of Acid submitted to trial, one septem of each of the following.	Septems of Soda Test used.	Degree of the Strong Acid.
Sulphuric acid of about sp. gr. 1.845	20 to 21	2000 to 2100
Muriatic acid of sp. gr. 1.16 to 1.18...	6 to 7	600 to 700
Nitric acid of about 1.5	12 to 13	1200 to 1300

An important source of error in this experiment is the extreme difficulty of measuring and transversing one septem of strong acid with correctness. A septem delivers from five to ten drops, according to the fluidity of the liquor under operation, and the difference of half a drop may influence the analysis from 10 to 20 per cent.

b. That difficulty is in part overcome by using five septems of the strong acid instead of one septem. The number of septems of soda test required to neutralise the acid will then be five times as much as before, and the result must be divided by five to give the Degree of the acid.

c. Third method. Mix 100 septems of the strong acid with some distilled water in a decigallon bottle, and dilute the mixture, at the temperature of 62° Fah., to the bulk of a decigallon. Fill your alcalimeter (which must be graduated into septems) with soda test of 100°. Put into a mixing-jar 100 septems of the diluted acid, add a little litmus, and neutralise the acid with the soda. (I pass over the description of the precautions necessary to be taken to ensure perfect accuracy in this experiment.) The number of septems of soda test of 100° required to saturate 100 septems of the diluted acid, multiplied by 10, gives the degree of the concentrated acid.

When the precise degree of the strong acid is ascertained, the next step is to reduce that acid by dilution to the exact strength at which it is required. This is to be done by means of a TEST-MIXER, a tall glass jar or bottle, graduated into 100 equal parts. Thus, a gallon jar may be divided into 100 centigallons; or a decigallon jar into 100 milligallons. A certain quantity of the strong acid, ascertained in the manner to be presently described, is accurately measured and mixed in a separate vessel with about three-fourths of the quantity of water known to be requisite for its ultimate dilution. When the heat produced by the mixture has abated, the acid is to be transferred into the test mixer, being carefully washed out of the separate vessel. It is to be diluted in the test mixer nearly to the required measure, allowed to cool to 62° Fah., and is then to be adjusted to the exact measure, with water at the same temperature. By this method a given measure of a strong acid is diluted by a single operation precisely to a given measure of another acid.

It only remains to show in what manner the respective quantities of the strong acid and the required diluted acid are to be ascertained.

Equivalent Volumes of Solutions.—The Equivalent Volume of a solution is the number of septems of it that contain 100 Degrees or one Test atom of its chemical constituent, considered in an anhydrous state. Thus, the Equivalent Volume of muriatic acid of 100° is 1000; that of acid of 200° is 500; and that of acid of 50° is 2000. Consequently, to convert acid of 200° into acid of 100°, 50 measures must be diluted to 100 measures, and to convert acid of 200° into acid of 50°, 25 measures of it must be diluted to 100. When the equivalent volume of a strong acid has been determined, and that also of a required weak acid, we have the exact measures from which the one is to be diluted to the other.

A good many years ago, I calculated an extensive series of Tables of acids and alcalies, in which the equivalent volumes of many thousand solutions are given; but those Tables have not been published. I give, therefore, the following methods for finding the Equivalent Volume from the Degree of a solution.

a. To those accustomed to the use of Logarithmic Tables, I may state the method as follows:—

> The Reciprocal of the Degree, multiplied by 100000, is the Equivalent Volume of the solution.

b. For those not accustomed to such Tables, I may state the following method:

> The Equivalent Volume is the product of 1000 divided by the Degree.

The following examples selected from a table of muriatic acid, will render the use of the Equivalent Volumes evident.

Specific gravity.	Degree.	Equivalent Volume.
1.2	752.59	132.87
1.1891	700.	142.86
1.1662	600.	166.67
1.1408	500.	200.00
1.1148	400.	250.00
1.0878	300.	333.33
1.0599	200.	500.00
1.0450	150.	666.67
1.0310	100.	1000.0

For the same Degree the Equivalent Volume is the same for all substances.

Preparation of Muriatic Acid Test of 100°.—I have now shown in what manner the Degree of any given sample of muriatic acid can be determined; how, from the degree, is it possible to determine the Equivalent Volume; and with the equivalent volume and a Test-mixer, to prepare any required weak acid from a strong acid.

Thus, to prepare a decigallon of muriatic acid of 100°, you require 166⅔ septems of acid of 600°, 333⅓ septems of acid of 300°, or 666⅔ septems of acid of 150°. These quantities diluted to 1000 septems give the acid required.

Preparation of Acids of 150°. The equivalent volume of any acid stronger than 150° produces acid of this strength when diluted to the volume of 666⅔; or the equivalent volume of the strong acid, multiplied by 1½, diluted to 1000, produces acid of 150°.

Preparation of Ammonia Test of 50°. — *a.* Ascertain approximately the strength of a pure solution of ammonia, by testing five septems of it in the manner described for the approximate testing of acids, using muriatic acid of 100° in the graduated alcalimeter, to neutralise the ammonia. The mixture of acids and ammonia is best made in a glass bottle of four ounces capacity, provided with a flat headed glass stopper. A few drops of litmus are used, no test paper is required, nor is the liquor to be heated.

b. Dilute the ammonia till it is of about 55° or 60°. Fill the centigrade alcalimeter with it. Put into the mixing bottle 50 septems of muriatic acid of 100°, and neutralise it with the diluted ammonia, of which 80 to 90 septems will be required.

c. Repeat experiment *b* with all possible care, and ascertain precisely the number of septems of ammonia required to saturate 50 septems of muriatic acid of 100°. That number of volumes diluted in the test-mixer to 100 volumes, constitutes the ammonia test of 50°. Ammonia test of this strength, if kept in a dark cool situation, in a well stoppered bottle, remains constant for a long time.

This completes the series of Test Liquors. Those required for ordinary use are the ammonia test of 50° and muriatic acid test of 100°. From time to time, the accuracy of the ammonia test is to be examined by means of the muriatic acid test, and the accuracy of the latter by means of the silver test and soda test.

Ordinary Processes of Testing. *Problem* 1. To test the strength of a mineral acid presumed to be 150°. Put 25 septems into a mixing-bottle, and test with ammonia of 50°. 75 septems should be required to neutralise the acid.

Problem 2. To test the strength of ammonia presumed to be 300°. Act on 25 septems of the ammonia with the muriatic acid test of 100°, of which 75 septems should be required.

Problem 3. To test the strength of acetic acid presumed to be 300°, Put 10 septems into a mixing bottle, and test with ammonia of 50°, of which 60 septems should be required to neutralise the acid.

Preparation of Acids and Alcalies of officinal strength.—The degrees of the stock acids having been tested by ammonia, and those of the alcaline liquors by muriatic acid, the officinal solutions are prepared by dilution in the test-mixer. After the solutions are diluted, they should be again tested, to ensure their accuracy.

LAW RELATING TO WEIGHTS AND MEASURES,

And the Alteration in the Drachm and Scruple Weights introduced by the Irish College of Physicians.

Mr. Redwood said, that reference having been made at the last Meeting, to the new weights introduced by the Irish College of Physicians, he thought it desirable, in discussing this part of the subject, that they should have the Act of Parliament to refer to, and clearly understand what the law is, and to what extent it permits such alterations. There were two Acts to which it would be necessary for him to refer: these were 5 Geo. IV., cap. 74, which was passed in 1824, and 5 and 6 Guliel. IV., cap. 63, passed in 1835. The former of these specifies the different denominations of weights and measures recognised by the law, and the latter indicates the circumstances under which these may be legally used. By the former of these Acts, the standard weights are thus described:—

> "And be it further enacted, That from and after the first day of *May* One thousand eight hundred and twenty-five, the standard brass weight of one pound troy weight, made in the year One thousand seven hundred and fifty-eight, now in the custody of the clerk of the House of Commons, shall be, and the same is hereby declared to be the original and genuine standard measure of weight; and that such brass weight shall be, and is hereby denominated the imperial standard troy pound, and shall be, and the same is hereby declared to be the unit or only standard measure of weight, from which all other weights shall be derived, computed, and ascertained; and that one-twelfth part of the said troy pound shall be an ounce; and that one-twentieth part of such ounce shall be a pennyweight; and that one twenty-fourth part of such pennyweight shall be a grain; so that five thousand seven hundred and sixty such grains shall be a troy pound, and that seven thousand such grains shall be, and they are hereby declared to be a pound avoirdupois, and that one sixteenth part of the said pound avoirdupois shall be an ounce avoirdupois, and that one sixteenth part of such ounce shall be a dram."

Here, then, the standard troy and avoirdupois weight, including the subdivisions of the pound, were clearly defined. In other parts of the Act instructions are given for reproducing the *unit* or *standard of weight*, in the event of its being lost or damaged. The imperial standard measures are also in like manner defined and established.

The object of the law clearly was to introduce one uniform system of weights and measures throughout the whole realm, for it states in the preamble to the Act of 1824, that "notwithstanding it is provided by the Great Charter that there shall be but one measure and one weight throughout the realm, and by the treaty of union between England and Scotland, that the same weights and measures should be used throughout Great Britain as were then established in England, yet different weights and measures, some larger and some less, are still in use in various places throughout the United Kingdom of Great Britain and Ireland, and the true measure of the present standards is not verily known, which is the cause of great confusion and of manifest frauds. For the remedy and prevention of these evils for the future, and to the end that certain standards of weights and measures should be established throughout the United Kingdom of Great Britain and Ireland, be it therefore enacted," &c.

The Act of 1824 established the standard weights for the United Kingdom of Great Britain and Ireland, but in introducing these weights, together with the new system of measures, it was found expedient to make provision, which was done by that and subsequent Acts, that, in certain specified cases, the quantities of goods might be computed by other modes than by the use of these weights and measures. After a period of ten years, during which the new system was gradually introduced, the Act of 1835 declares that—

> "Whereas it is expedient that the use of all weights and measures not in conformity with the weights and measures established by the said recited Acts (Act of 1824, &c.) should be *prohibited*, * * * and also, that so much of the said recited Acts as allow the use of weights and measures not in conformity with the imperial standard weights and measures established by the said Acts, or allow goods or merchandize to be bought or sold by any weights or measures established by local custom or founded on special agreement, shall be, and the same are hereby repealed."

* * * *

"And be it enacted, That from and after the passing of this Act, all articles sold by weight shall be sold by avoirdupois weight, except gold, silver, platina, diamonds, or other precious stones, which may be sold by troy weight, and drugs, which, when sold by retail, may be sold by apothecaries' weight."

* * * *

"And be it enacted, That from and after the passing of this Act, the measure called the *Winchester* bushel, and the lineal measure called the *Scotch* ell, and all local or customary measures, shall be abolished; and every person who shall sell, by any denomination of measure other than one of the imperial measures, or some multiple or some aliquot part, such as half, the quarter, the eighth, the sixteenth, or the thirty-second parts thereof, shall, on conviction, be liable to a penalty not exceeding the sum of forty shillings for every such sale: Provided always, that nothing herein contained shall prevent the sale of any articles in any vessel, where such vessel is not represented as containing any amount of imperial measure, or of any fixed, local, or customary measure heretofore in use."

He thought these references to the Acts of Parliament would be sufficient to prove that the alteration of the value of any of the denominations of weights or measures established by law could be made only by the Legislature. If the Irish College of Physicians had the power of introducing a new system of weights and measures, the English and Scotch Colleges might, with equal authority, introduce other systems, and thus the object of the Legislature would be defeated, and worse confusion created than existed before the passing of the laws to which he had referred. He admitted, however, that the present system of weights and measures in this country was, in many respects, defective. He had no doubt that a change would, ere long, be made by the Legislature, and when made he hoped it would have for its object the establishment of a decimal system.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Dec. 13, 1850.

R. SUMNER, ESQ., IN THE CHAIR.

DR. BRETT gave an able and interesting lecture on the metal zinc. He commenced by describing and exhibiting the various ores containing zinc, which is principally associated with carbonic acid, silica, sulphur, oxides of iron and manganese, lead and alumina. He then described the English method of reducing zinc from sulphuret, or a mixture of sulphuret and carbonate, and the Silesian method by which it is obtained principally from the carbonate, and gave a preference to the latter plan, which he stated was now being adopted in this country, from which much less loss of metal results. The peculiar properties of zinc as a metal were then noticed. At a moderate temperature, 250° to 300° Fah., it becomes malleable and plastic, but heated to about 500° Fah., it again becomes brittle, at 700° it melts—on cooling it crystallizes. Perfectly pure zinc is incapable of decomposing dilute sulphuric acid, but ordinary zinc is acted on violently by that liquid in consequence of the galvanic current established between the zinc and the lead, and other metals present as impurities. Hydrogen is then evolved from its surface. If, however, an ordinary zinc plate be amalgamated with mercury, the same results are obtained as if pure zinc were employed, for the pure metal is brought uniformly to the surface of the plate, and no current is set up when the plate so prepared is immersed; if a slip of platinum be also immersed and made to touch the zinc, a current is set up, but the hydrogen is released from the platinum, which is the negative pole.

The salts of zinc employed in medicine were severally described, and the impurities and adulterations noticed. Native calamine, or carbonate of zinc, generally consists (as sold in the shops) of chalk, sulphate of baryta, and oxide of iron. Valerianate of zinc is also subject to great adulteration. Sulphate of zinc is a dimorphous salt, and is isomorphous with sulphate of magnesia; both these salts crystallize with seven equivalents of water, and when slowly evaporated take the form of right rhombic prisms; when more rapidly crystallized they assume the oblique rhombic form. If the former crystals be heated till they become opaque, the fragments will be found changed to the oblique form.

Several other salts of zinc were described.

Mr. H. S. Evans read a paper on Botany, in which he traced the progress made in the science since the early ages, and noticed the defects of the various systems which have been discarded, and many of the imperfections still remaining, and gave an encouraging sketch of the progress the science has made of late years, and urged the importance of the subject to every Pharmaceutist.

The Secretary announced that a Conversazione would be held in the Museums of the Royal Institution, on the 17th of January, 1851, when Drs. Brett, Dickinson, Inman, Nevins, Higgins, Thomson, and Messrs. Hamilton, Archer, and Evans, will illustrate the subjects connected with objects of interest in the Museum and Lecture-room.

ORIGINAL AND EXTRACTED ARTICLES.

MITCHAM: ITS PHYSIC GARDENERS AND MEDICINAL PLANTS.

(Continued from p. 299.)

In our last number we noticed the cultivation of Mints at Mitcham. We have subsequently received the following communication on the subject, from a cultivator of medicinal plants at Carshalton, adjoining Mitcham.

PEPPERMINT, ITS CULTIVATION AND PRODUCE.

Land, intended for peppermint, should be of a rich friable soil, rather moist, but not stagnant. If poor, it should have about twenty tons of manure to the acre, nor less than twelve if previously dressed; if more, the plant is apt to go to leaf at the expense of the oil. This should be ploughed under ten inches deep in the beginning of winter, for although the stolons run upon the surface, the main roots descend deep in the soil, and this proceeding is requisite to keep the plants in a growing state during the hot part of summer. At the latter end of March, the furrow ridges are harrowed down to make the ground level for the planters, who proceed with an instrument resembling a rake, having four large projecting teeth set to the distance the rows are intended to be apart, which is from four to eight; when eight they are one foot apart; when only four, they are eighteen inches apart, and the plants one foot apart in the rows, and between every bed two rows are missed or left out for the allies the following year. The described tool is drawn up and down the land, marking the true position of the rows; the first year the allies are not thrown out. The planting is begun when the plants are about four or five inches high, according to the season, which is in April. The plants are the skimmings of old beds where they rise above four or five stems, or from old beds intended to be destroyed, or are purchased by the bushel. They vary very much in price, according to the previous season; about five shillings commonly, but sometimes from three shillings to twenty shillings. Although last winter was mild, they were very scarce, owing to the previous dry summer, which killed many of the old plants. The older the plants, the more oil they produce, in proportion to the bulk of stems. The first year the beds require hoeing five or six times, at an expense of six shillings per acre. The second year, at the approach of winter, the allies are thrown out to cover the mint, about two inches deep, for which the men are paid eighteen shillings per acre; if manured, three shillings more for spreading. The soil lays rough until the beginning of March, when it is harrowed down with light harrows, after which the beds are thinned for future beds, leaving about four or five to each stole, according to strength. Then follows dotting; that is, a man going over the beds, and pecking out the weeds with the corner of a hoe, and throwing them into the allies. For this he is paid four shillings per acre. From this time, until the mint is fit to cut, it is hoed about four times, at six shillings per acre. I omitted to say that the first planting cost twenty-one shillings per acre for labour. The third year is the same as the second, but the allies then becoming so deep and wide, occasion such an encroachment on the beds, that they are destroyed for other crops, but are frequently ploughed in for future plants the next spring, when they are entirely destroyed. Cutting begins when the mint is well in flower. The men are paid twelve shillings per acre for cutting. Their business is to cut the plant and lay it in Prussian mats (which are less than the Russian) in bundles weighing 1 cwt. each, in which, if the weather be wet, it is skewered up and taken to the still at once, as the rain occasions a great loss of oil. But should the weather be favourable, it is dried in the field, for reasons to be explained.

The stills commonly hold a ton; that is, twenty bundles of green mint, but when dried, thirty. When stills are hired, they charge twenty-one shillings per still, or once filling, which makes it advantageous to the grower. Green mint will run off three-and-a-half pounds on the average, and dry mint from four to five pounds. An acre of mint produces about five tons; that is, from four to six, as seasons produce great variations, both in plant and oil. *Spearmint* is treated in a similar way to peppermint, but the plant being stronger, requires more room. It is but little grown here, and that for culinary purposes.

Diseases of the Mints.

The greatest detriment to mints is termed the smut or parasitical fungi, of which there are three species, very troublesome, but more so in dry summers, which occasion the plants to get rusty and lose their leaf, diminishing the bulk very much. The worst is *Æcidium menthæ*, which spreads over the whole plant. It is of a dull yellow colour, and attacks the plant just before it flowers. The next is *Uredo Labiatarum*. This attacks the under side of the leaf, and is frequently mixed with the former. It is of a light brown colour. A third species, *Puccinia menthæ*, attacks the plant in spring, and frequently disappears before the others are seen. The under part of the plant being covered with minute black spots, especially in wet seasons. Other fungi of a higher order, are parasitical on the stems after cutting, and probably arise from decay.

The mints or other medicinal plants grown in this parish, are on a small scale, many growers not having above half an acre, and of lavender about the same: the above are the principal herbs grown here; besides two or three small general growers, who supply Covent Garden.

About fifty acres of mint, and fifty of lavender, are grown at Carshalton,

Lavendula latifolia[*] has been grown here, and seeds very freely, but is not held in very high estimation.

SWEDISH COLLECTION OF MATERIA MEDICA.

The following extract of a letter from Dr. N. P. Hamberg, Assistant Professor of Pharmacy at the Royal Carol. Institute of Stockholm, to Dr. Pereira, may probably interest some of our readers:—

"To the study of Materia Medica but little attention has been given in this country [Sweden], probably because there were scarcely any complete collections of drugs to be found. I, therefore, determined in 1842 to fill up this deficiency, by arranging in cases complete collections of drugs; which determination I carried out in 1843, when the first part was completed; and since then the others have also been sufficiently arranged. Being an Apothecary in Stockholm at that time, it was in my power to set so low a price on these collections, that medical students here could easily obtain them, by which means the study of Materia Medica has been rendered easier, and consequently more attention has been paid to it. Not less than fifty persons—partly Physicians, partly Apothecaries—in Finland, Norway, and Sweden, having ordered and also now received the collections complete, I can say that I have gained the object desired; for if even the work has not given any pecuniary advantage, it nevertheless affords me the greatest satisfaction to have in some degree promoted the study of so important a branch of medical science as Materia Medica."

One of these collections has been sent by Dr. Hamberg to Dr. Pereira. It is contained in a polished wooden cabinet, twenty-seven inches long, twenty inches deep, and twenty inches high. On opening the folding-doors five drawers are seen, each covered by a sliding lid. The drugs are, for the most part, contained in wooden compartments, covered by sunken lids; but the gums, resins, and some of the seeds and fruits are preserved in glass tubes. The collection consists of 337 articles, all carefully labelled, and is accompanied by a printed list of the various articles. It is by far the most complete, compact, and useful collection for students that we have seen, and does Dr. Hamberg very great credit.

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[*] *Lavendula latifolia* is the *L. spica* of De Candolle.—Ed. Ph. J.

MITES IN BROWN SUGAR.

By submitting the brown sugar of the shops to careful microscopic examination, Mites (*Acari*), both dead and alive, are discovered in some, not in all, samples. To detect them, put the sugar into a little water; the mites usually come to the surface, and float there. They are then to be fished out by a needle, or other fine pointed instrument. The animals somewhat resemble the itch-mite (*Acarus Scabiei*). Can they be the cause of the so-called grocer's itch? We are inclined to think not; for this malady has not been observed to be contagious, which it would be, did it depend, like common itch, on the presence of mites. It is an old saying among the sugar dealers, that some sorts of brown sugar are *alive;* that is, when the sugar is made up into a heap it readily falls down. *Query*, Is this due to the presence of mites? Sugar which is alive is usually regarded as of superior quality.

ON CARYOPHYLLINE, AND A NEW ACID FROM CLOVES.

BY SHERIDAN MUSPRATT, M.D., F.R.S.E.,
Professor of the Liverpool College of Chemistry.

When cloves are digested with ether, and the spirituous extract is treated with water, a quantity of a white substance separates—caryophylline. I allowed it to settle as much as possible before filtration. The separation of the solid from the liquid, by filtration, occupied a week, owing to the syrupy condition of the mixture.

It is with the greatest difficulty and labour that the caryophylline is purified. I dissolved it in strong sulphuric acid, and then precipitated by water, but this did not yield it pure. A portion, several times affused with ether, and dried, was, to a certain extent, purified, but still some green resin adhered to it. Having tried all the acids and fixed alkalies for its purification, I applied to Baron Liebig, who recommended treating it with ammonia. This was accordingly done. The caryophylline was several times—after treatment with ether—boiled with this volatile alkali, which rendered it pure.

When the ethereal extract is treated with a small quantity of water, the caryophylline crystallizes. It forms spherical aggregates of acicular crystals; inodorous, tasteless, nearly insoluble in water, sparingly soluble in alcohol, but copiously dissolved by ether.

A quantity of these crystals were purified by ammonia, and then submitted to the combustion tube.

Analysis of the Compound.

.1063 grammes of caryophylline gave—
.3100 " carbonic acid, and
.1020 " water.

These numbers correspond to the following per centages—

Carbon	79.02
Hydrogen	10.62

and lead to the formula, $C_{10}\ H_8\ O$, as may be seen by the annexed comparison:—

		Theory.		Experiment.
10 equivalents of	carbon	60	78.96	79.02
8 "	hydrogen	8	10.52	10.62
1 "	oxygen	8	10.52	10.36
1 "	caryophylline	76	100.00	100.00

The carbon is *a very little* too much in my analysis, but not sufficiently significant to warrant a closer result. Dumas obtained 79.5 per cent. of carbon, evidently proving that his caryophylline had eviscerated traces of the green resin, to which I have heretofore referred.

Caryophylline is extremely indifferent to chemical action. It is not decomposed by any of the strong acids or alkalies. With concentrated sulphuric acid it gives a fine carmine colour, which passes into a brown; sulphurous acid is eliminated in the heat. Water, when added to the mixture, precipitates the caryophylline in white flakes. It sublimes at about 285°, and condenses in the upper part of the tube in needles.

This remarkable substance appears to bear the same relation to oil of cloves, as camphor does to oil of camphor.

Mr. Joseph Danson and myself are at present working upon cloves, which, when treated with water, the mixture filtered, and the filtrate drenched and boiled with nitric acid, yield an indifferent substance and a most remarkable acid. We intend operating upon twenty pounds of cloves, in order to get enough of the acid for a complete investigation. One of my former students, Dr. Robert Scott, teacher of chemistry in the Liverpool Mechanics' Institution, occupied himself with the acid; but circumstances prevented his carrying out the research. It is one well worthy of a six months' labour; therefore I have undertaken it collaterally with my assistant.

College of Chemistry, Liverpool, Oct. 1850. *Lancet.*

DESCRIPTION AND FIGURE OF THE CEDRON OF THE MAGDALENA RIVER (*SIMABA CEDRON, Planchon*).

BY SIR W. J. HOOKER, D.C.L., F.R., A., AND L.S.

Of late, many inquiries have been made by medical gentlemen respecting a seed, or rather the cotyledons of the seed, of a plant well known in New Grenada to the natives under the name of "*Cedron*," and long celebrated there for its powerful medicinal properties. By whom it was first brought into notice in Europe, I am not aware; but my earliest information respecting it was derived from Mr. Wm. Purdie, late botanical Collector for the Royal Gardens of Kew, and now Curator of the Botanic Garden of Trinidad. At Bogotà Mr. Purdie had made the acquaintance of Dr. Cespèdes, an intelligent physician of the country, who directed his attention to the plant in question, and who forwarded to me a drawing, with very fair analysis of the flowers and fruit, which had been some time in his possession, and is inscribed—"*The* Cedron, *by Mutis: it has probably some inaccuracies.*" In his future journeyings, Mr. Purdie did not fail to search for the plant in its native woods, and on his way to the province of Antioquia, near the Magdalena, he wrote word, July, 1846—"I have had the good fortune to detect the celebrated *Cedron*, a small tree, with the habit of the Jamaica Mountain-Pride (*Mela Azedarach*). The seeds are here much sought after, and sold at one real each cotyledon, being considered an invaluable specific for the bites of snakes, for intermittents, and stomach-complaints generally. The bark and wood, also, abound in a high degree with the bitter principle. Seeds, and dried specimens, and fruit preserved in brine, will be dispatched to the Royal Gardens."

The dried specimens sent by Mr. Purdie were further accompanied by the following note :—" The *Cedron* has an erect stem not more than six inches in diameter, crowned by an umbellate mass of branches, with large handsome pinnated foliage. So highly are the seeds prized here for their powerful medicinal virtues, that they cannot be purchased for less than two reals, or one shilling each. I have had the testimony of medical men in Bogotà in favour of their properties, and Dr. Cheyne has frequently tried them with success. Dr. Cespèdes some years ago, was sent expressly on a mission from Bogotà to the locality of this plant, which is in woods immediately behind the village of San Pablo, on the banks of the Rio Grande de Magdalena." The *Cedron* is, however, probably more extensively distributed than Dr. Cespèdes and Mr. Purdie imagine, especially to the westward towards the Pacific, in New Grenada; for another collector for Kew Gardens, then, and still, on board H.M. Surveying Ship the " Herald," (Capt. Kellett, Commander) transmitted specimens to Kew the following year, 1847, from the " Isla de Caybo."

I am informed that the thirty-first volume of the *Comptes Rendus**, recently published, contains some information respecting the *Cédron*, from the pen of M. Jamord; but as I have not access to this work at the present time, I must content myself with an extract from an article in the *Athenæum* journal for September, 1850, where it is observed :—" An account is given in the continental papers of a great congress of medical men which it is proposed to hold in France, for the purpose of testing, by experiment, the virtue of a newly discovered cure for madness, and for the bites of venomous serpents, by means of ' *Cedrone* ' seed. It seems that two individuals, M. Auguste Guillemin and M. Hippolyte Fournier, Professor of Mathematics of the department of Arveyron, have offered themselves to be operated on,—which means, we suppose, that they offer to let themselves be bitten, for the purpose of the inquiry." " It has been thought advisable," says the *Brussels Herald*, " to postpone until next month the experiment to be tried on M. Auguste Guillemin, in order to afford sufficient time for all the celebrated men of France and other parts of Europe to meet together at this sort of medical congress, in which one of the most difficult problems of occult medicine is to be solved. It is announced that all the different

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* Since the above was in type, Dr. Wallich has most kindly referred to that work, and sent me the following extract from pp. 141–2:—

[Translation.] " MEDICINE.—*Seeds employed in Tropical America as a remedy against the effects of the bite of serpents.* (Note of M. Jamord.)

" On leaving this city last week, M. Herran, Chargé d'Affaires de la République de Costa Rica in France, sent me some seeds of a tree called by the country people *Cédron*, and which grows on the *plateaux* of the Cordilleras of the Andes. The property attributed to this seed, of being a powerful antidote against the bite of the most dangerous serpents naturally appears to call for some notice, and M. Herran wishes that it may be submitted to the necessary experiments to test its efficacy.

" I therefore present to the Academy the seeds which M. Herran gave me, as well as the following extract of a letter which he wrote to me on leaving :—

" It was only in 1828 that the native Indians brought to the market of Carthagena some seeds of *cédron*. To prove their infallible virtue they submitted animals and themselves to be bitten by the most dangerous serpents, called *toboba*, *corlia de la Montagne*, &c., and the promptitude with which the poison was neutralized was so marvellous, that a single seed sold for a doubloon (eighty-three francs).

" During my long sojourn in Central America I had recourse to the seeds of cédron in eight different cases. The following is the way I used them:—Five or six grains of powder obtained by rasping the seed were mixed with a spoonful of brandy and given to the patient; and the bitten part was dressed with some linen moistened with some of the brandy. The patient was then allowed to repose, and I had rarely occasion to repeat the dose to effect a radical cure.

" I have also successfully employed this medicine in intermittent fevers which had resisted sulphate of quinine."

States of Europe will be represented at this meeting :—Russia, by a physician attached to the person of the Emperor; the German States, by seventeen doctors; and Sweden, Norway, and Denmark, will send delegates, although in those cold regions there are but few serpents, and cases of madness are rare. Some of the *Cedrone* seed will be sown in the Jardin des Plantes, where it is hoped it will succeed. Several of the faculty who have already made experiments on different animals, hope, by means of the *Cedrone* seed, to arrive at the cure of mental disorders and epilepsy."

Dr. Pereira, in the new edition of his inestimable *Materia Medica*, now in course of publication, has not yet come to the natural family (*Simarubaceæ*) to which this plant belongs: I, therefore, applied to that gentleman, to ask if he was aware of any experiments having been tried in England with *Cedron*. He writes in reply (Nov. 2. 1850):—"I am not acquainted with any observations made in England, or even in Europe, respecting the *Simaba Cedron*. The little which I know about it I will relate to you, and you can make what use you please of my statement.

"The specimens of the seeds and fruit which I possess, were brought a few months ago from Panama, by a gentleman (not a medical man). They were given to him by W. Barrington, Esq., an English surgeon at Panama. The statement accompanying them, was to the effect that the seeds were much used, and with great confidence, by the native doctors of the Panama country, both locally and internally, as the grand antidote against snake-poison.

"To the taste, these seeds are intensely bitter, and doubtless, like the bitter barks and woods of other Simarubaceous plants (*e. gr. Quassia* and *Simaruba*), they possess the properties of bitter tonics, and might be useful in dyspepsia, and perhaps, even ague. Notwithstanding the faith of the Panama doctors, I am afraid there is not a shadow of hope that these seeds will prove an antidote against snake-poison; all the reputed antidotes to snake-poisons having hitherto proved unworthy of trust when used under the eye of competent observers."

Experiments will probably tend to confirm the soundness of the above observations of Dr. Pereira, and tend to show that the French doctors, as well as those of Panama, have taken an exaggerated view of the merits of the *Cedron*. As an intensely bitter principle, it will probably rank with its near botanical allies, *Quassia* and *Simaruba*, and is worthy of a figure and description in a journal, one of the objects of which is to make known useful and little-known vegetable products.

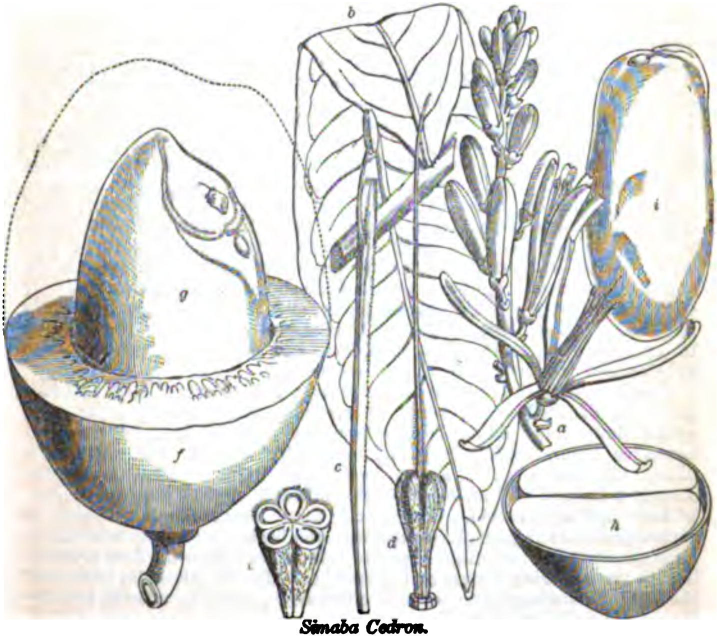
M. Planchon has the merit of giving a name and botanical station to this plant. In his excellent *Revue de la Famille des Simaroubées*, published in the fifth volume of the *London Journal of Botany*, p. 566, he has first described this plant, from Mr. Purdie's specimens in my herbarium. He does not seem to have been aware of the existence of the fruit in the Museum of the Royal Gardens. This we are able to subjoin to our figure, and at first sight it is very unlike that of any other species in appearance and in size (so far as can be judged from the only fruits of a *Simaba* figured or described,—that of *Simaba Guianensis*, *Aubl.*, *Guian.*, vol. i., p. 153, and Kunth, *Nov. Gen. Am.*, vol. vi., p. 514). "Carpella 4-5." Here the carpel or drupe is as large as a swan's egg, and solitary, but evidently so by the abortion of the other three or four ovaries; this circumstance, too, is indicated by the obliquity of the scar near the summit, representing the position of the style. The seed of commerce consists simply of the separated cotyledons, not much unlike blanched almonds, but larger and plano-convex.

Simaba, *Cedron*, Planch.; trunco erecto, ramis subumbellato-capitatis, foliis longissimis pinnatis glabris sub-20-jugis cum impari, foliolis subcoriaceis elliptico-lanceolatis acuminulatis basi obliquis, racemis elongatis compositis ramis rufescenti-subvelutinis, drupis magnis ovalibus solitariis.

S. Cedron, *Planchon in Hook. Lond. Jour. Bot.*, vol. vi., p. 566.

HAB. New Grenada. Banks near San Pablo of the Magdalena. *W. Purdie.* Isle de Caybo, coast of the Pacific, *Thomas Seemann.*

DESCR.—The height of the *tree* is not exactly stated, but it probably does not exceed twenty feet, with an erect, undivided *trunk*, not more than six inches in diameter, crowned with a dense and somewhat umbellate head of *branches*. *Leaves* glabrous, two feet and more long, pinnated with twenty or more alternate, rarely opposite, subcoriaceous, sessile *leaflets*, 4-6 inches long, acuminulate, oblique (or inæquilateral) at the base, penninerved; the *rachis* is terete, terminated by an odd leaflet. *Racemes* two feet and more in length, strict, branched, the main *rachis* and *branches* clothed with minute, ferruginous, velvety down, chiefly towards the apices; *branches* short, solitary, or clustered; *pedicels* bracteolated. *Calyx* minute, cup-shaped, obscurely 5-toothed, ferruginous-downy. *Corolla* of five, linear, obtuse or retuse, spreading *petals*, pale brown and downy externally. *Stamens* ten, short, arising from the back of as many staminiferous *scales*, which are erect, and approximate into a tube. *Anthers* oblong, introrse. *Ovaries* five, seated upon a columnar *gynophore*, downy. *Styles* five, united into one, above the base, and exceeding the stamens in length. *Ovules* one in each ovary. *Fruit* a very large, solitary (by



Simaba Cedron.

a, branch of a raceme; *b*, a leaf; *c*, scale, bearing a stamen; *d*, ovaries, with the gynophore; *e*, transverse section through the five ovaries, *magnified*; *f*, fruit cut round transversely, so as to exhibit the solitary seed *g*; the dotted line shows the outline of the entire fruit; *h*, transverse section of the seed; *i*, a cotyledon, in the state in which it is exported :—*nat. size.*

abortion) *drupe*, of an oval form, oblique at the top, and having a scar below the summit, indicating the former site of the style. The soft portion of the fruit seems, in the preserved state, not to have been very soft and fleshy: it is lined with a horny *endocarp*. *Seed* large, solitary, suspended, its integument membranaceous, with a conspicuous *chalaza*. *Albumen* none. *Embryo* conform with the side. *Cotyledons* very large, fleshy, white when fresh.—*Hooker's Journal of Botany.*

ON MARACAIBO BARK, A NEW KIND OF CINCHONA BARK, CONTAINING QUINOIDINE.

BY DR. F. L. WINCKLER.

Among various specimens of bark lately received from London, was contained one, with the denomination of *bark from Maracaibo*. On examining the latter, Dr. Winckler discovered in it a remarkable combination of kinovate of quinoidine, and a very peculiar yellow colouring matter, which is neither changed nor precipitated by chloride of iron, also a considerable quantity of kinovate of lime, but only a small proportion of tannin, and not a trace of red cinchonic.

Of the bark itself, Winckler gives the following description: smaller and larger, partly flat, partly more or less curved, uncoated-pieces, of a light brownish-yellow colour, approaching to red. The surface presents throughout longitudinal fibres, and is distinguished from the under surface only by a smoother appearance. The under surface consists of moderately fine fibres, and feels soft: the individual fibres, which can be separated by the finger, break by the slightest pressure, and do not enter the skin like those of Calisaya bark. In some pieces the upper surface consists of imbricated fibrous layers, which can be separated by the knife into thin laminæ. So also with many pieces on the under surface. The whole substance of the bark is remarkably soft, and can, therefore, be easily broken longitudinally and transversely. The transverse fracture consists of very short splinters, and the projecting fibres can readily be broken off. The longitudinal fracture possesses a feeble brilliancy, like that of Calisaya bark, and is considerably lighter than the upper and lower surface, in spots almost pale rust-coloured, without brilliancy, like the colour of some pale spots in the transverse section of light-coloured Russian rhubarb. Epidermis was only observed partially in a few coarser pieces, and its appearance is exactly like that of Cusco bark, or of hard Carthagena bark. The taste is very bitter, more disagreeable than bark-like, and is rather permanent; the substance of the bark becomes soft in chewing.

The hot infusion of the bark, prepared with 100 grs. of bark and four ounces of distilled water, when filtered hot, was perfectly clear, pale reddish-brown, and did not become turbid by cooling. It tasted very disagreeable bitter, not like bark, and was easily filtered. On testing the filtered liquid with tannin, a considerable proportion of alkaloid was discovered; chloride of iron coloured the infusion slightly greenish-brown, without making it turbid. Oxalic acid threw down lime. Sulphate of copper produced no precipitate, although the bark contains kinovic acid in large quantity. The author supposes this to arise from the firm union of it with the colouring matter and quinoidine. In the alcoholic extract of the bark, the decomposition of this compound cannot be effected even by lime.—*Central Blatt*, 1850, No. xli., p. 655.

ON THE COLOUR PRODUCED BY TINCTURE OF GUAIACUM ON CERTAIN VEGETABLE SUBSTANCES.

BY J. H. VAN DER BROCK.

Some time since, Schönbein published (*Central Blatt.*, 1849, p. 173) some experiments concerning the blue colour which slices of potato acquire on the addition of tincture of guaiacum, and mentioned that the substance which becomes blue is more abundant near the skin and about the eyes of the potatoes than in any other part. Van der Brock has tested a considerable number of vegetable grains, &c., such as ripe and unripe French beans, broad beans, common barley, rye, oats, pearl barley, wheat, peas, millet, buck-wheat, nuts, bitter and sweet almonds, rice, chestnuts, alder-wood, oak-wood, &c., and he concludes that it is the albuminous matter of plants which probably produces this reaction. There are other bodies contained in plants which admit this reaction, but these have as yet not been sufficiently recognised; they appear, however, to be substances which are in a state of speedy transformation, produced by what is called, after Mitscherlich, *contact action*.

Amygdalin, legumin, starch and its isomeric substances, and tannin of gall-nuts, have no influence upon this colouration.—*Central Blatt.*, 1850, No. xl. and xli., p. 635.

ON GITHAGIN.

BY E. A. SCHARLING.

Scharling has extracted from corncockle (*Agrostemma Githago*) a peculiar poisonous principle, to which he has given the name of *Githagin*.

The seeds of corncockle contain *githagin*, *fatty oil*, *gluten*, *sugar*, *gum*, *starch*, *vegetable albumen*, and the usual salts of the vegetable kingdom.

Githagin when dry resembles starch, but has a more silky appearance, and under the microscope appears somewhat crystalline. It is odourless and almost tasteless: after a short time a burning sensation is felt on the palate. It does not act on vegetable colours. It is soluble in water and dilute spirit, but it is insoluble in absolute alcohol and in ether. It is reddened by sulphuric acid like salicine. Its aqueous solution yields a precipitate with subacetate of lead.

Githagin acts as a poison on the smaller animals. A few drops of a solution (three grains of githagin in a drachm of water) killed a canary bird in twenty-four hours. A solution of ten grains killed a rabbit. Ten grains of githagin merely caused vomiting in a dog.—*Central Blatt.*, No. xli., p. 651, 1850.

LABDANUM CRETICUM.

BY X. LANDERER.

Cistus salviæfolius in particular, also *villosus*, *creticus* (*κίστος κίσθαρος*) of *Dioscorides*. The cistus roses grow in abundance on the declivities of the hills of Greece. The infusion is used as tea against colds and rheumatic affections. Although they become glutinous in Greece, they do not yield any real exudation, which can be gathered. From *Cistus creticus*, however, *Labdanum* is gathered in Crete by the so-called Labdanists from the middle of May to the middle of July, when the plants are very glutinous. This is done by a peculiar wooden instrument, called *Lambdanistirion*, resembling a rake, with leather straps instead of the points, and three semi-circular zinc supports (*zinkentragern*). These they pass over the plants until the straps become quite cylindrical and ropelike by the adhering resin, the bulk of which is increased by the straps being rolled about in the sand; after this the mass is scraped off with a knife and kneaded. One labdanist collects in one day, from nine o'clock in the morning till four in the afternoon, two pounds of labdanum, worth from thirty to forty piasters. The labdanum is moulded in various forms, and the *Labdanum in tortis* is considered to be the best. It is mostly used in the East for fumigation. Labdanum in the mass is often considered to be adulterated; and that from Cyprus is preferred at Constantinople to the best from Crete.

ON THE VOLATILE OIL OF NUTMEGS.

BY C. G. MITSCHERLICH.

FROM a series of experiments with ol. nucistæ æthereum on rabbits Mitscherlich draws the following conclusions:—

1. The volatile oil of nutmegs is a strong poison; for six drachms of it killed a middle-sized rabbit in the space of 13½ hours; two drachms killed a strong rabbit within five days; one drachm killed a small rabbit in about thirty hours; one drachm of the oil injected into the stomach of a full-grown rabbit made it sick and ill for several days, after which it recovered. The volatile oil of nutmegs is weaker in its action than the oils of mustard, savine, and caraway, and is stronger than the oils of fennel, lemon, turpentine, juniper, and copaiba, but is nearly equal in strength to the oil of cinnamon.

2. The oil of nutmeg is absorbed, and appears to undergo a change in the blood, and passes out in this altered condition in the urine, to which it imparts a peculiar, pleasant, aromatic odour. Neither the natural odour nor the changed odour could precisely be discovered in the blood or in the breath.

3. The oil of nutmegs produces in the stomach and jejunum a similar alteration of structure to that of the oils of caraway, fennel, lemon, turpentine, juniper, copaiba, bitter almonds, and cinnamon. In the stomach extravasation of blood and formation of blood-vesicles on the mucous membrane, which was partially softened and devoid of blood, without being inflamed in the adjacent parts. The interior of the duodenum was much divested of epithelium and filled with mucus. In the first experiment, with the enormous dose of six drachms, the stomach and the jejunum were injected with blood.

4. The most important symptoms of poisoning were frequent and powerful pulsation of the heart; slight acceleration of breathing; at first restlessness, afterwards weakness of the muscles, but considerably less than from oil of cinnamon; little or no diminution of sensibility, evacuation of hard fæces from the colon; ejection of a peculiarly smelling sanguineous urine after smaller doses, but no increased diuresis; decrease of strength and of the pulsation of the heart; difficult breathing; diminished heat in the external parts; death without convulsions. Death was produced by the absorption of the volatile oil.

Effect of the Oil of Nutmegs upon the Skin of the Human Body.—Part of the dorsal surface of the hand was moistened with the volatile oil of nutmegs. After four minutes a very slight burning sensation was felt, which gradually increased, so that after fifteen minutes it became very unpleasant, and on being touched the reddened spot caused much pain. After thirty minutes the moistened spot was red; it burnt like after a sinapism when the skin is moderately reddened. Upon being washed the burning sensation disappeared within an hour: the epidermis did not scale off. In a second experiment with another individual the symptoms were much slighter, the burning appeared only after ten minutes, and became rather strong after another ten minutes; the hand being then washed after thirty minutes, the burning sensation was still very intense, but the skin was not red. The burning sensation continued for about half an hour: the epidermis did not scale off.—*Buchner's Rep.*, vol. xvi. 1850, p. 104.

ON CASSIA LIGNEA (CINNAMOMUM AROMATICUM, *Nees.*)

BY DU MENIL.

If the decoction of cassia lignea which remains in the still after the preparation of aqua cinnammomi, be evaporated to dryness, powdered, and treated with alcohol, a dark tincture of an agreeably bitter aromatic taste is obtained, which is well adapted for yielding an excellent liqueur. The author tested cassia lignea for alkaloids, but obtained negative results. From his experiments he concludes that this bark contains a trace of *resin*, fifty-two per cent. of *vegetable fibre*, fourteen per cent. of *gum*, and eighteen per cent. of *tannin*—*Central Blatt.*, No. xxxvii., 1850.

ON THE CHEMISTRY OF ASSAFŒTIDA.

BY HLASIWETZ.

If assafœtida be treated with strong alcohol, the resin and volatile oil are completely dissolved, the gum and impurities (consisting chiefly of gypsum) remain behind.

From the alcoholic tincture, the alcohol and volatile oil may be separated from the resin by distillation, so that the latter remains behind almost inodorous. If the distillation be performed with water in a copper still with a tin head, the tin becomes strongly acted on by the sulphur contained in the volatile oil. The distillation was, therefore, afterwards undertaken in a large glass retort, heated in a salt-water bath, in order to avoid the burning of the residue.

One pound of assafœtida of the best quality yielded, on the average, one ounce of volatile oil, equal to about three per cent.

The volatile oil of assafœtida is a thin fluid of a light yellow, clear, and of a penetrating smell. It is very readily dissolved by strong alcohol; water also takes up a considerable quantity of it, from which reason the *aqua assafœtidæ* is particularly rich in oil, and has an acrid taste. Hlasiwetz found also valerianic acid and metacetonic acid in it. The volatile oil of assafœtida does not redden the skin as some other oils do which contain sulphur; it is also neutral to test paper. After it has stood for some time it evolves a large proportion of sulphuretted hydrogen; this property it imparts to crude assafœtida. It does not congeal by artificial cold. Its boiling point cannot be exactly determined, for when heated, it developes, before and during boiling, sulphuretted hydrogen, and becomes thus decomposed. This boiling, however, takes place at 130° to 140° C. When fresh, it consists of carbon, hydrogen, and sulphur, without oxygen; but if exposed for some time to the atmosphere, it becomes slightly acid, and its odour is slightly altered.

Repeated analyses of the crude volatile oil have shown that its per centage composition varies with the method of obtaining it, and, according to its age: the carbon varied from 64.24 to 69.27; the hydrogen from 9.09 to 10.48; the sulphur from 20.17 to 25.43 per cent., so that, according to these results, a compound of a higher and of a lower proportion of sulphur with one and the same radical, may be calculated according to the following formulæ:—

I.	II.	III.	IV.
$C_{12} H_{11} S_2$	$3 (C_{12} H_{11} S_2)$	$5(C_{12} H_{11} S_2)$	$C_{12} H_{11} S_2$
$C_{12} H_{11} S$	$C_{12} H_{11} S$	$2 C_{12} H_{11} S$	$2 (C_{12} H_{11} S)$

Dr. Hlasiwetz has examined the relations of this oil to various agents, *e.g.*, ammoniacal gas, liver of sulphur, muriatic acid, chlorine gas, nitric acid, chromic acid, sulphurous acid, potassium, lime, soda, oxide of silver, oxide of lead, and chloride of platinum, and he analyzed most carefully the numerous results he obtained.

The resin of assafœtida is dirty white ; in the air it soon becomes pink-red ; in concentrated sulphuric acid it is dissolved with a green colour ; water throws it down from this solution in the form of pink-red flocculi ; heated in a retort it loses first the water adhering to it and a small quantity of volatile oil, which possesses the smell of assafœtida. At the same time it froths much, and develops sulphuretted hydrogen. As soon as all the water is expelled the froth disappears, the resin becomes dark-brown and boils steadily. The oils which now distil over during the decomposition of the resin are partly green, blue, violet-red, and of a more or less aromatic smell ; diluted caustic potash lye is coloured yellow by them and becomes turbid. The violet portion communicates to the potash lye an oil, which becomes intensely red in the air. The potash liquor with which the oils have been washed, contains, besides sulphuretted volatile oil, chiefly formic acid, and a trace of acetic acid.

The gum of assafœtida is, when dry, grey and horny, and yields, by dry distillation, formic acid with a small quantity of acetic acid and a kind of tar, containing sulphur.

Formic acid and acetic acid were also obtained by treating the red volatile oil of assafœtida with caustic soda. Valerianic acid and metacetonic acid could not be discovered in it. But, upon heating the soda-lime in the oil-bath to 200° C., and allowing the volatile oil to drop on it, a volatile oil of a smell similar to lavender was formed, and valerianic acid, together with metacetonic acid and acetic acid remained behind in combination with the soda-lime.—*Buchner's Rep.*, No. xvi., 1850, p. 83.

THE USE OF HYDROFLUOSILICIC ACID IN QUANTITATIVE ANALYSIS.

BY MR. H. ROSE.

Hydrofluosilicic acid has been long in use for separating potash from various acids with the view of obtaining an aqueous solution of the latter; chloric acid, perchloric acid, chromic acid, as well as other acids, are by this means separated from potash, in solutions of their potash salts. In quantitative analysis, however, it has not been used to remove potash, because the silico-fluoride of potassium, though difficultly soluble, is not entirely insoluble in water.

Silico-fluoride of potassium is, however, perfectly insoluble in a liquid mixed with alcohol. If, therefore, the solution of a potash salt be mixed with an excess of hydrofluosilicic acid, then, with an equal volume of strong alcohol, the whole of the potash falls down as silico-fluoride of potassium, which must be washed with strong alcohol diluted with an equal volume of water. In the same way soda can be quantitatively determined by hydrofluosilicic acid.

Berzelius has availed himself of the insolubility of the silico-fluoride of barium to separate quantitatively, and qualitatively, baryta from strontia by hydrofluosilicic acid, and this method is certainly the best known. If, however, baryta be precipitated from its watery solution by hydrofluosilicic acid, a loss is experienced, because the silico-fluoride of barium is not completely insoluble in water, but if it be precipitated from an alcoholic solution, the result is quite accurate, and whilst the quantity of strong alcohol required for the precipitation of silico-fluoride of potassium and silico-fluoride of sodium must be equal to the volume of the watery solution, a much smaller quantity will throw down all the silico-fluoride of barium.—*Central Blatt.*, 1850, No. xliii., p. 686, and *Bericht d. Akad. d. Wissenschaften*, Berlin, 1850, p. 272.

OBSERVATIONS ON ETHERIFICATION.

BY THOMAS GRAHAM, F.R.S., F.C.S., &C.

In the ordinary process of etherizing alcohol, by distilling that liquid with sulphuric acid, two distinct chemical changes are usually recognized; namely, first, the formation of sulphovinic acid, the double sulphate of ether and water; and, secondly, the decomposition of the compound named, and liberation of ether. The last step, or actual separation of the ether, is referred to its evaporation, in the circumstances of the experiment, into an atmosphere of steam and alcohol vapour, assisted by the substitution of water as a base to the sulphuric acid, in the place of ether. The observation, however, of M. Liebig, that ether is not brought off by a current of air passing through the heated mixture of sulphuric acid and alcohol, is subversive of the last explanation, as it demonstrates that the physical agency of evaporation is insufficient to separate ether. Induced to try whether ether could not be formed without distillation, I obtained results which appear to modify considerably the views which can be taken of the nature of the etherizing process.

The spirits of wine or alcohol always employed in the following experiments, was of density 0.841, or contained 83 per cent. of absolute alcohol.

Expt. 1.—One volume of oil of vitriol was added to four volumes of alcohol, in a gradual manner, so as to prevent any considerable rise of temperature. The mixture was sealed up in a glass tube, one inch in diameter, and 6.6 inches in length, of which the liquid occupied 5.2 inches, a space of 1.4 inch being left vacant, to provide for expansion of the liquid by heat. The tube was placed in a stout digester containing water, and safely exposed to a temperature ranging from 284° to 352° (140° to 178° C.) for one hour.

No charring occurred, but the liquid measured on cooling 5.25 inches in the tube, and divided into two columns, the upper occupying 1.75 inches, and the lower 3.5 inches of the tube. The former was perfectly transparent and colourless, and on opening the tube, was found to be ether, so entirely free from sulphurous acid, that it did not affect the yellow colour of a drop of the solution of bichromate of potash. The lower fluid had a slight yellow tint, but was transparent. It contained some ether, but was principally a mixture of alcohol, water, and sulphuric acid. The salt formed by neutralizing this acid fluid with carbonate of soda, did not blacken when heated, from which we may infer that little or no sulphovinic acid was present.

The principal points to be observed in this experiment are its entire success as an etherizing process, without distillation, without sensible formation of sulphovinic acid, and with a large proportion of alcohol in contact with the acid, namely, two equivalents of the former nearly, to one of the latter. When the proportion of the alcohol was diminished, the results were not so favourable.

Expt. 2.—A mixture of one volume of oil of vitriol and two volumes of alcohol, sealed up in a glass tube, was heated in the same manner as the last. The liquid afterwards appeared of an earthy-brown colour by reflected light, and was transparent and red by transmitted light. Only a film of ether was sensible after twenty-four hours, floating upon the surface of the dark fluid.

Expt. 3.—With a still smaller proportion of alcohol, namely, one volume of oil of vitriol with one volume of alcohol, which approaches the proportions of the ordinary etherizing process, a black, opaque liquid was formed at the high temperature, thick and gummy, without a perceptible stratum of ether, after standing in a cool state.

Crystals of bisulphate of soda, containing a slight excess of acid, were found to etherize about twice their volume of alcohol in a sealed tube quite as effectually as the first proportion of oil of vitriol, when heated to the same temperature. The two liquids found in the tube were colourless, no sulphurous acid appeared, and only a minute quantity of sulphovinic acid. Crystals of bisulphate of soda, which were formed in an aqueous solution, and without an excess of acid, had still a sensible but much inferior etherizing power.

Expt. 4.—A mixture was made of oil of vitriol with a still larger proportion of alcohol, namely, one volume of the former and eight of the latter, or nearly one equivalent of acid to four equivalents of alcohol. This mixture was sealed up in a tube, and heated for an hour between 284° and 317° (140° and 158° C.), which appeared sufficient for etherizing it. A second exposure for another hour to the same temperature did not sensibly increase the ether product. The column of ether measured 1.25 in the tube, and the acid fluid below 2.5 inches. Both fluids were perfectly colourless.

It thus appears to be unnecessary to exceed the temperature of 317° (158° C.) in this mode of etherizing, and that the proportion of alcohol may be increased to eight times the volume of the oil of vitriol without disadvantage.

Expt. 5.—The proportions of the first experiment were again used, namely, one volume of oil of vitriol with four volumes of alcohol, and the mixture heated as in the last experiment to 317° (158° C.). The upper fluid, or ether, measured 1.1 inch in the tube, the lower fluid 2.65 inches. The latter had a slight yellow tint, like nitrous ether, but only just perceptible. It gave, when neutralized by chalk,—

Sulphate of lime	83.11	grains
Sulphovinate of lime	4.91	"

The last salt was soluble in alcohol, and crystallized in thin plates.

Here again the formation of sulphovinic acid in a successful etherizing process is quite insignificant.

New results at 317°, from the other proportions of one volume of oil of vitriol with one and two volumes of alcohol, were quite similar to those obtained in experiments 2 and 3, at the higher temperature of 352°. In none of these experiments did there appear to be any formation of olefiant gas, and the tubes could always be opened, when cool, without danger.

Neither glacial phosphoric acid nor crystallized biphosphate of soda etherized alcohol to the slightest degree, when heated with that substance, in a sealed tube, to 360° (182° C.). Even chloride of zinc produced no more, at the same temperature, than a trace of ether, perceptible to the sense of smell.

Expt. 6.—To illustrate the ordinary process of ether-making, a mixture was prepared, as usually directed, of

100 parts of oil of vitriol,
48 " of alcohol (0.841),
18.5 " of water.

This liquid was sealed up in a glass tube, and heated to 290° (143° C.) for one hour. It became of a dark greenish-brown colour, and opalescent, with a gummy looking matter in small quantity. No stratum of ether formed upon the surface of the fluid.

The tube was opened, and the fluid divided into two equal portions. One of the portions was mixed with half its volume of water, and the other with half its volume of alcohol, and both sealed up in glass tubes and exposed again to 290° for one hour.

It would be expected, on the ordinary view of water setting free ether from sulphovinic acid, that much ether would be liberated in the mixture above, to which water was added. The ether which separated, however, amounted only to a thin film, after the liquid had stood for several days. In the other liquid, on the contrary, to which alcohol was added, the formation of ether was considerable, a column of that liquid appearing, which somewhat exceeded half the original volume of the alcohol added. In fact, the sulphovinic acid was nearly incapable of itself of yielding ether, even when treated with water. But it was capable of etherizing alcohol added to it, in the second mixture, like bisulphate of soda or any other acid salt of sulphuric acid.

The conclusions which I would venture to draw from these experiments are the following:—

The most direct and normal process for preparing ether, appears to be, to expose a mixture of oil of vitriol, with from four to eight times its volume of alcohol of 83 per cent., to a temperature of 320° (160° C.) for a short time. Owing to the volatility of the alcohol, this must be done under pressure, as in the sealed glass tube. The sulphuric acid then appears to exert an action upon the alcohol, to be compared with that which the same acid exhibits when mixed in a small proportion with the essential oils. Oil of turpentine, mixed with one-twentieth of its volume of sulphuric acid, undergoes an entire change, being chiefly converted into a mixture of two other hydrocarbons, terebene and colophene, one of which has a much higher boiling point and greater vapour-density than the oils of turpentine. This hydrocarbon does not combine with the acid, but is merely increased in atomic weight and gaseous density, without any further derangement of composition, by a remarkable polymerizing action (as it may be termed) of the sulphuric acid. So of the hydrocarbon of alcohol; its density is doubled in ether, by the same polymerizing action. Chloride of zinc effects, with alcohol, at an elevated temperature, a polymeric catalysis of the latter, of the same character, but in which hydrocarbons are formed, of even greater density and free from oxygen.

This view of etherification is only to be considered as an expression of the contact-theory of that process which has long been so ably advocated by M. Mitscherlich.

The formation of sulphovinic acid appears not to be a necessary step in the production of ether; for we have found that the etherizing proceeded most advantageously with bisulphate of soda, or with sulphuric acid mixed with a large proportion of alcohol and water, which would greatly impede the production of sulphovinic acid. It appears, indeed, that the combination of alcohol with sulphuric acid, in the form of sulphovinic acid, greatly diminishes the chance of the former being afterwards etherized; for, when the proportion of oil of vitriol was increased in the preceding experiments, which would give much sulphovinic acid, the formation of ether rapidly diminished. The previous conversion of alcohol into sulphovinic acid, appears, therefore, to be actually prejudicial, and to stand in the way of its subsequent transformation into ether.

The operation of etherizing has attained a kind of technical perfection in the beautiful continuous process now followed. The first mixture of alcohol and sulphuric acid is converted into sulphovinic acid, the sulphate of ether and water, which acid salt appears to be the agent which polymerizes all the alcohol afterwards introduced into the fluid. Bisulphate of soda, with a slight excess of acid, acts upon alcohol in the same manner, and its substitution for the acid sulphate of ether would have a certain interest, in a theoretical point of view, although a change of no practical importance in the preparation of ether.

Sulphuric acid does not appear to be adapted for the etherizing of amylic alcohol. M. Balard, by distilling these substances together, obtained a variety of hydrocarbons, some of them of great density, but no ether. The polymerizing action of the sulphuric acid appears to advance beyond the ether stage. I have varied the experiment by heating amylic alcohol in a close tube, to 350° (176° C.), with oil of vitriol, to which one, two, three, four, and even six equivalents of water had been added, without obtaining anything but the hydrocarbons of Balard. The formation of these was abundant, even with the most highly hydrated acid, and with a very moderate colouration of the fluid.—*Quarterly Journal of the Chemical Society.*

ON THE REFINING OF GOLD.

BY DR. PHILIPP.

The process of refining gold by the dry method, called the process of cementation, has been long known, although it has sometimes been considered a secret, and is employed but by very few persons for refining alloyed gold, its use being principally to remove from that metal bodies which form an obstacle to its malleability. Experiments have been made for completely refining gold by way of cementation; but, in operating thus, loss of the precious metal has been observed on the one hand, and on the other sufficient purity has not been obtained, the consequence of which is, that the old processes have been retained. After numerous experiments, M. Philipp has arrived at the conclusion, that, by means of cementation, gold may be obtained of the greatest possible purity, that is to say, of the quality known in commerce as fine gold. The success of this very simple operation depends,—1st. upon the choice of the ingredients used for cementation; 2nd, upon the preparation of the mass; 3rd, upon the degree of fineness of the alloy to be treated; and 4th, upon the temperature employed.

1. *Ingredients employed for Cementation.*—Many receipts have been proposed for this purpose. Thus, to refine one gramme of gold, the following ingredients have been employed, viz., 6 grms. of brick-dust, 2 grms. of protosulphate of iron, ½ grm. of alum, 2 grms. sea-salt, 1 grm. saltpetre, ½ grm. sal-ammoniac; or 12 grms. of brick-dust, 6 grms. of sea-salt, 3 grms. of sulphate of zinc, ¾ grm. saltpetre; or 6 grms. brick-dust, 1½ grm. sal-ammoniac, ¾ grm. sea-salt, and ½ grm. carbonate of soda. These receipts did not furnish satisfactory results. In fact, the two first occasion a loss of gold (as the saltpetre and sea-salt should not be employed together), and the latter furnishes gold which contains silver.

The following formula is at once more simple and more advantageous, viz., 3 grms. brick-dust, 1 grm. sea-salt, 1 grm. alum, and 1 grm. sulphate of iron.

2. *Preparation of the Mass.*—The sea-salt, alum, and sulphate of iron, after being thoroughly dried, are reduced to fine powder, which is added to the brick-dust, and mixed intimately until the whole becomes one homogeneous mass. This powder is then damped with a little wine-vinegar, to form a paste, in the midst of which, the gold to be operated upon is placed, and the whole is introduced into an earthen vessel or melting-pot. When the gold is in fragments, it may be distributed throughout the mass.

3. *Quality of the Gold.*—Gold of from eight to twelve carats is the best adapted for this method of refining. With finer gold, the matters which dissolve the alloyed portions, cannot so readily penetrate the mass, as it is not sufficiently porous. If therefore the gold is finer, it must be alloyed with copper, until it is of the desired quality. With gold of less than eight carats, there is, on the other hand, this inconvenience,—that the mass of gold which remains after the operation does not possess sufficient consistency to allow of its being extracted without loss from the powder of cementation.

4. *Temperature employed in the Operation.*—The melting-pot or vessel is introduced into a charcoal fire, covered up, and heated slowly, so as not to become red-hot in less than three or four hours. The duration is regulated according to the thickness of the gold, being less for laminated gold and

thin-leaf gold. A dull red heat appears to be the most advantageous; for, if at the commencement, or during the course of the operation, too great a heat be applied, the decomposition of the materials will be too rapid, and the products will not act sufficiently upon the gold. When the crucible is cold, the powder adhering to the gold is carefully detached and completely removed by means of boiling water. The gold in this state is porous and friable, and of a fine pure yellow colour. It is fused into a mass with borax.

The following is the explanation of the operation:—In the presence of the sulphuric acid of the sulphate of iron, the sea-salt gives off chlorine, which converts the gold into chloride; but, at the temperature indicated, it is reduced to the metallic state, whilst the other metals originally mixed therewith, are dissolved in the powder of cementation. The alum delays the operation, and the brick-dust, by its interposition, favours the slow and gradual disengagement of the chlorine.—Newton's *Journal*, August, 1850.

ON THE BEST PREPARATION OF ARSENIC FOR INTERNAL ADMINISTRATION,

And on the Chemical Composition of Fowler's Solution.

BY LLOYD BULLOCK, ESQ.

During several years past, I have from time to time been asked by practitioners, both in town and country, whether no better and more convenient form of arsenic could be recommended for internal administration than the liquor arsenicalis of the Pharmacopœia. It appears to be the opinion of many who employ arsenic, either as an anti-periodic, or against skin diseases, that the officinal preparation is uncertain in its action—what is usually deemed a small dose in some cases acting with violence, whilst, in others, large doses produce but little effect. This may doubtless, in a great measure, be referred rather to peculiarities of constitution in the patient than to differences in the preparation. Nevertheless, the mode of preparing the liquor arsenicalis adopted by all the colleges belongs to a period antecedent to the present state of chemistry, which demands, in all cases, precision, and the rejection of every process, either vague in itself, or admitting the possibility of failure to obtain the intended result. In the instance of the solution of a metallic salt, the maintenance of a certain standard strength being always the desired object, it is certainly always desirable, if possible, first to obtain the salt in a crystalline form, and then, being assured of its purity, both by its chemical and physical characters, to dissolve it in an exact amount in the necessary proportion of menstruum. On this principle I have for several years recommended the employment of the arseniate of soda, a salt which has all the required characters of great solubility, definite form, and the additional pharmaceutic advantage of being readily made into pills, in such a manner as to ensure every pill containing any given fraction of a grain with perfect accuracy. Moreover, it may be kept in a crystalline form, and dissolved readily, as it is required. Of the arseniate of soda I have received reports from a great many practitioners, invariably favourable as to its therapeutic effects.

The use of arseniate of soda in medicine is nothing new. It is the basis of Pearson's solution, which consisted of one grain of arseniate of soda to one ounce of water. What the reasons may be which led to this salt having been hitherto omitted from the Pharmacopœia, I am unaware.

About twelve months ago, my attention was particularly directed to the liquor arsenicalis by a physician, who was dissatisfied with its effect, and, at his suggestion, I was induced to look more closely into this preparation. The directions of the Pharmacopœia for preparing liq. arsenicalis are as follow:—

"Take of arsenious acid, broken into small pieces, carbonate of potassa, each eighty grains; compound tincture of lavender, five fluid drachms; distilled water, a pint. Boil the arsenious acid and carbonate of potassa with half a pint of the water in a glass vessel until they are dissolved. Add the compound tincture of lavender to the cooled liquor. Lastly, add besides, of distilled water, as much as may be sufficient, that it may accurately fill a pint measure."

I made the following experiment:—

1. Taking 80 grains of arsenious acid in coarse powder, 80 grains of carbonate of potassa, P.L., and 10 ounces of water, I found a perfect solution effected, on heating, to 212°, with the evolution of only a trace of carbonic acid.

2. The solution was then boiled until it ceased to give off carbonic acid: it required about twenty hours, an equivalent of the carbonate of potassa was decomposed, forming arsenite of potassa, corresponding with the following formula:—

$$\begin{array}{cccccc} As\,O_3 & K\,O, C\,O_2, 1\frac{1}{2}\,H\,O & & As\,O_3 & & K\,O, C\,O_2, 1\frac{1}{2}\,H\,O \\ 99 \quad : & 83.5 & :: & 80 & :: & 67.5 \end{array}$$

It would appear, therefore, that the liquor arsenicalis of the Pharmacopœia is a solution of arsenious acid in carbonate of potassa, with a minute quantity of arsenite of potassa. On looking through all the dispensatories, and commentaries on the Pharmacopœia, I was surprised to find no allusion to this fact. Soubeiran, however, notices it, but no other French writer on Pharmacy subsequent to Soubeiran, that I am aware of.

If it be desirable to give arsenious acid with carbonate of potassa, the following process will give a uniform preparation:—Take eighty grains of arsenious acid in coarse powder; eighty grains of carbonate of potassa, P.L.; compound tincture of lavender, five fluid drachms; distilled water sufficient to make up twenty ounces. Boil the arsenious acid in fifteen ounces of water until dissolved, remove it from the fire, allow it to cool a few minutes, and add the carbonate of potassa dissolved in four ounces of cold water; when the temperature of the mixture is reduced to 60°, add the compound tincture of lavender; lastly, make up to exactly twenty ounces with distilled water.

It is probable that many gentlemen may wish to prescribe a true arsenite of potassa, a salt they supposed they were exhibiting in the liq. arsenicalis of the Pharmacopœia. To distinguish this salt from Fowler's solution, it may be called liq. potassæ arsenitis neutralis, and instead of sp. lavand. co., a small quantity of a distilled spirit could be used. The liquor potassæ arsenitis neutralis may be prepared by taking 80 grains of arsenious acid, and 67.5 grains of carbonate of potassa, P.L., or 81.6 grains of crystallized bicarbonate of potassa. Boil in ten ounces of water until no more carbonic acid is evolved; when cold, make up to exactly twenty ounces, with distilled water, and if thought desirable, a small quantity of a distilled spirit.

There appears to be a variety of opinions as to the best form of giving arsenic. Mr. Hume and others, vide *London Medical and Physical Journal*, vol. xxiv., would prefer binarseniate of potassa, but I find that this compound, which was admitted into the former edition of the Dublin Pharmacopœia, has been recently omitted.

The binarseniate of potassa is a beautiful salt easily prepared: keeps well, and from its fine crystalline form its purity is readily ascertained. It would be well if some satisfactory reasons were given for the rejection of this salt.

M. Boudin considers a simple solution of arsenious acid in distilled water as the best; whilst Bieto prefers arseniate of ammonia. There is also a solution of arsenic in some repute, known as De Valangin's solution of solvent mineral, which is a solution of arsenious acid in hydrochloric acid.

It appears to me that the weight of testimony is in favour of arseniate of soda. M. Cazenave speaks highly of it; and upon the whole I should say it is probably milder in its action than other forms of arsenic, and, as far as I know, is devoid of objection.

The best method of administering the arseniate of soda is in the form of pills, made up with crumb of bread, or some inert powder.

In conclusion, I think I cannot do better than quote Dr. Powell, who, writing on arsenic, observes, "when the dose is small, and the effect so powerful, the most minute attention to its proportion and preparation becomes necessary."—*Lancet.*

Conduit Street, Dec., 1850.

COMPOSITION OF SCILLA MARITIMA.

BY G. C. WITTSTEIN.

1. *Experiments with the fresh bulb.*—A fresh bulb, weighing, after the removal of all external tunics, twenty-five ounces was cut into small pieces, by which the pulpy laminæ evolved a very slight leek-like odour, and a glutinous liquid, which had a strong acid reaction, and caused a violent itching and burning in the hands, which lasted for several hours. The mass was digested, with double its quantity of pure water, in a glass vessel for several days in a water-bath, then pressed, and the residue digested with a smaller quantity of water, and again pressed.

a. The liquid thus obtained was very turbid, with a dark reddish tint, inodorous, and had a strong bitter taste. It was evaporated in the water-bath to the consistency of a thin syrup, during which process, blackish membraneous masses separated. The filtered liquid had at first a brownish-yellow colour, which became gradually darker. I mixed it with its double volume of alcohol of ninety per cent, which rendered it milky, and a brownish, tough, lumpy sediment (gum) fell. The supernatant deep-yellow liquid having become almost clear, after twenty-four hours, was filtered and distilled, the residue heated in a flat pan, till every trace of alcohol was got rid of, and then mixed with fresh yeast at a proper temperature. After a few days—during which time no perceptible fermentation had taken place—the liquid was again filtered off from the yeast, and slowly evaporated. A light yellow syrup remained, which, when cold, had the consistency of a stiff extract, and eventually manifested no further change. As it did not perfectly dissolve in strong alcohol, and consequently still contained some gum, I dried it with the addition of some quartz sand, treated the powdered mass with alcohol, evaporated the tincture, and left the extract again standing for several weeks, and this time also without any perceptible alteration.

The extract tasted very bitter, easily dissolved in alcohol and water, and both solutions, which were of a deep golden yellow colour, had a strong acid reaction. Ether took up traces only of it. A solution of sugar of lead produced in the watery solution an inconsiderable clay-coloured precipitate; after which, an abundant dirty yellow precipitate was yet thrown down by acetate of lead. The filtered liquid was yellow, like wine, had an acid reaction, but did not become turbid by acetate of lead. After the removing the excess of lead by sulphuretted hydrogen, and evaporating with the addition of ammonia, in order to facilitate and to complete the removal of the acetic acid introduced with the lead salt, I obtained a yellow extract, which was acid, and possessed an excessively bitter taste, and left a burning sensation on the tongue and lips. Part of this extract was dissolved in water, the solution saturated with barytic water, and evaporated. The taste was bitter, acrid, and slightly acid.

The remainder of the extract was dissolved in water, and the solution shaken with fresh precipitated and washed oxide of lead, which latter assumed a yellowish colour, whilst the liquid became lighter. Filtered and deprived by sulphuretted hydrogen of a small quantity of dissolved lead, the liquid left behind a yellow extract, which was neutral, and whose taste was very bitter, but no longer acrid. The acrid matter had, therefore, combined with the oxide of lead, and was consequently of an electro-negative nature; but my endeavours to liberate it from the oxide of lead, and to examine it separately, were fruitless, which is chiefly to be ascribed to its small quantity. This acrid matter of squill appears, then, to form with oxide of lead an insoluble compound, but with baryta a soluble one.

From what has been now stated, it follows that the bitter matter of squills is not identical with the acrid matter, the two being different substances. They accompany each other in the common solvents; but the acrid matter is electro-negative, the bitter matter indifferent. Neither of them is volatile, and therefore is not got rid of in the drying of squills. A portion of the pure bitter extract was tested for nitrogen with potash, according to Lassaigne's process; but the result was negative.

The precipitate obtained by alcohol, which I termed *gum*, weighed nearly one and a half-ounce, or six per cent. of the fresh and—as squill loses in drying seventy-nine per cent.—twenty-eight per cent. of the dry bulb. Vogel's statement, that the dry bulb contains six per cent. of gum, and twenty-four per cent. of tannin, appears therefore to rest upon a slip of the pen, which is to be corrected into twenty-four per cent. of gum and six of tannin. The precipitate exhausted with alcohol forms, after drying, a dirty reddish, if finely triturated, pale flesh-coloured, brittle, amorphous, inodorous, and tasteless mass, which is permanent in the air.

b. The dried residue of *a*, which remained after expression, weighed $2\frac{5}{24}$ ounces. By successive treatment with ether and alcohol, small proportions of the bitter and acrid matters of wax, fatty oil, and resin, were extracted from it, after which it weighed yet $2\frac{1}{8}$ ounces.

2. *Experiments with the dry bulb.*—If the dried and powdered bulb be exhausted by alcohol, it yields only a very small quantity of the bitter and acrid matters, as they are closely enveloped by a considerable quantity of gum, and therefore are unacted on by alcohol. The *dried* bulb must therefore be *previously* treated with water, the watery extract evaporated to the consistency of a thin syrup, precipitated by alcohol, &c., &c., as described under *a*. For medicinal purposes, it will be sufficient to inspissate the watery extract liberated, after having freed it by alcohol of gum. This extract might be denominated *Extractum Scillæ Spirituosum.*—*Buchner's Repertorium*, 1849, vol. ii., page 200.

ADULTERATION OF TEA.

The following notice of a new mode of adulterating tea, appeared in a recent number of *Dickens's Household Words*, on the authority of a correspondent:—

"A short time since," he says, "a friend of mine, a chemist in Manchester, was applied to for a quantity of French chalk, a species of talc, in fine powder; the party who purchased it, used regularly several pounds a week; not being an article of usual sale in such quantity, our friend became curious to know to what use it could be applied; on asking the wholesale dealer who supplied him, he stated his belief, that it was used in '*facing*' tea (the last process of converting black tea into green), and that within the last month or two, he had sold in Manchester upwards of a thousand pounds of it. Our friend the chemist then instituted a series of experiments, and the result proved that a great deal, if not all the *common* green tea used in this country is coloured artificially. The very first experiment demonstrated fraud. The plan adopted was as follows:—A few spoonfuls of green tea at five shillings a pound, were placed on a small sieve, and held under a gentle stream of cold water flowing from a tap for the space of four or five minutes. The tea quickly changed its colour from green to a dull yellow, and upon drying with a very gentle heat gradually assumed the appearance of ordinary black tea. On making a minute microscopic examination of the colouring matter washed from the leaf, and which was caught in a vessel below, it appeared to be composed of three substances, particles of yellow, blue, and white. The blue was proved to be Prussian blue—the yellow thought to be the turmeric, and the white French chalk. If the two former be mixed together in very fine powder, they will give a green of any required shade. It is made to adhere to the tea-leaf by some adhesive matter, and then it is "faced" by the French chalk, to give it the pearly appearance so much liked.

"This simple experiment any one can perform. A gentleman assured me that a friend of his a short time since, happened—though quite unintentionally—on his part, to walk into a private room connected with the establishment of a wholesale tea-dealer, and there he saw the people actually at work converting the black tea into green; the proprietor soon discovered his presence in the room, and before him in no measured terms, severely reprimanded the workmen for having permitted a stranger to enter.

MORE LEAD IN SUGAR REFINING.

Messrs. F. and G. Hills, manufacturing Chemists, of Deptford, have, within the last few days, specified a patent for "Certain Improvements in Manufacturing and Refining Sugar." The patentees' invention consists of a process for removing the excess of sulphuretted hydrogen remaining in saccharine solutions after the use of that agent, or of the hydro-sulphurets of the earths, for the purpose of precipitating the lead employed in the manufacture or refining of sugar. This removal the patentees propose to accomplish by means of *sulphite or carbonate* of lead, or precipitated oxide of iron. We have thus sulphuretted hydrogen in the first place employed to remove the lead from saccharine solutions, and then lead re-introduced to effectuate the removal of the sulphuretted hydrogen. Woe to the consumers of refined sugar, bastards, and treacle, for here is the *acknowledged poisonous salt of lead* (the carbonate) openly introduced into the process of manufacturing and refining sugar. The combination of this, with the lead sugar patents previously specified, will, we suppose, render the lead process of refining sugar perfect.

THE FORTHCOMING LONDON PHARMACOPŒIA.

BY MR. GEORGE M'GILL.

It seems to be certain that we are to have a new Pharmacopœia early in the next year; if such be the case, I beg to call your attention to the great inconvenience and danger in the first introduction of the work to Chemists, if Physicians do not adhere to some fixed rule—one understood by Chemists in regard to what is ordered, for doubtless there will be alterations as well as additions, and probably of so embarrassing a kind, that what is meant will have to be guessed, if something is not done to prevent it. Such was the case when the last Pharmacopœia was issued. Now, I propose that some plan should be devised and carried into effect by the Pharmaceutical Society, which will in some measure, at least, obviate difficult questions arising. I would suggest that a circular be sent to all Chemists, requesting them to write and present a memorial to each Physician in their vicinity to ask, that should any other preparation than what is ordered in the new Pharmacopœia be desired, that it should be designated, so as to prevent the possibility of mistake; but that unless so expressed, the new edition would be understood as intended. The Pharmaceutical Society may issue a circular to each London Physician at all events, who are so numerous. However, what may be thought best to give the most security to the dispenser will advance the object I have in view. Perhaps inserting this or some remarks of your own, in the next Journal, will be productive of practical good.

15, *Walworth Road*, *Dec* 4, 1850.

[The Chemists might certainly memorialise the Physicians on the subject, but would the Physicians comply with the suggestions of the Chemists, while they disregard the orders of their own College ?—Ed.]

PORTABLE DOMESTIC VAPOUR-BATH.

Mr. Culverwell, of 16, Charlotte Street, Blackfriars Road, has sent us an apparatus under the above title, which presents a very economical means of applying steam as a bath, either to the whole body or to any part of it. It consists of a little copper boiler, holding about a pint of water, supported on a stand, and heated by a spirit lamp. The steam escapes from one or several apertures at the top. When used as a bath for the whole body, it is placed beneath a chair, on which the patient sits, and covers himself with a blanket. When used for the local application of steam, this is allowed to escape at one orifice only, and is conveyed through a flexible tube.

UNFOUNDED RUMOUR RESPECTING A MEDICINE LICENCE.

The following paragraph has appeared in the *Weekly Times*, and several other newspapers, and has given rise to numerous speculations and inquiries :—

> "A new form of licence to retail Chemists and Druggists has lately come into force, permitting the sale of medicines. The licence is issued from the Inland Revenue Board, and its annual cost is two pounds."

On inquiry at the Inland Revenue Office and at Somerset House, we have ascertained that this statement is a penny-a-line fib.

NOTICES OF BOOKS.

Elements of Materia Medica and Therapeutics. By Jonathan Pereira, M.D., F.R.S., and L.S. Third Edition, enlarged and improved. Vol. ii., Part I.

In announcing the appearance of this part of the new edition of Dr. Pereira's work, we do not propose to offer any comments upon its general merits, the decision of competent judges on this point being unanimous, and sufficiently well known. We shall confine our notice to those characters in the volume before us by which it is distinguished from the corresponding part of the preceding edition. The growing reputation which the work has sustained for many years, the increased confidence which repeated reference to its pages has inspired, that the best accredited information, with reference to the subjects treated of, would be found there, as far as was known at the period of publication, and the character which the author has always maintained for indefatigable zeal in seeking out whatever is new, and unravelling whatever is intricate in the department of Materia Medica, have tended to raise high expectations with reference to this new edition; and we feel confident, from a perusal of the work, as far as it has yet been carried, that such expectations will not be disappointed. There are, a large amount of new matter, many new woodcuts, and a beautifully executed steel engraving, representing the microscopic appearances of officinal starch-grains, which are drawn to one uniform scale. The whole of the matter appears to have been submitted to careful revision, and much of it has been entirely re-written, so as to ensure its being completely brought up to the present state of pharmacological knowledge. This volume contains the whole of the cryptogams, and the endogens or monocotyledons, and it also contains the gymnospermous, the monochlamydous, or apetalous, and the corollifloral exogens. When completed the work will form, as the title-page indicates, an Encyclopædia of Materia Medica, including notices of most of the medicinal substances in use in the civilized world.

THE CORRELATION OF PHYSICAL FORCES. By W. R. GROVE, M.A., F.R.S. Second edition, 8vo, pp. 119. London: Samuel Highley, Fleet Street.

ON EXCISION OF THE ENLARGED TONSIL, *and its Consequences in Cases of Deafness, with Remarks on the Diseases of the Throat.* By WILLIAM HARVEY, M.R.C.S., &c. &c. 8vo, pp. 121. London: H. Renshaw, Strand; Hunton, York.

TO CORRESPONDENTS.

Fid.—The specimen marked No. 1, appears to be much better in quality than No. 2. We could not give a more precise answer without analysing the specimens.

Liber.—Dr. Pereira has pointed out a marked distinction between creta præparata and creta precipitata, showing that the substitution of the latter for the former is not in all cases justifiable. See vol. x.

M.P.S. (Cheltenham).—The deposit in cod-liver oil in cold weather, is occasioned by the solidification of the margarine. This takes place when the oil is reduced to a temperature below that at which it was previously filtered. Consequently, the two samples alluded to may be equally genuine, but one filtered at a lower temperature than the other.

Nero.—(1). The literal meaning of the word *amorphous*, is *without form*. —(2). Dr. Pereira's *Materia Medica*.

A Member (Plymouth).—We are not acquainted with any special work which we could recommend, on the subject alluded to.

A Subscriber (Dublin).—We think it not likely that the Apothecaries' Company (of London) would proceed against a licentiate of Apothecaries' Hall, Dublin, although the law would admit of such proceeding, if the party were practising as an apothecary in England.

The communications of *Z.* and *V. J.* have been received. *X.O.X.* has been answered by post as requested.

A Correspondent forcibly points out the inconvenience arising from the multiplication of private formulæ differing so little from the officinal preparations, that the object of the stenography might be supposed to be collusion between the writer and the prescriber. We have already discussed this subject at some length. It is certainly very inconvenient for a Chemist to be obliged to send to the other end of the town for a preparation, when he has one exactly like it on his own shelf. It is, however, difficult to controul prejudice. See our number for September last.

WANSTEAD INFANT ORPHAN ASYLUM.—Lewis Richard Standly, whose father was a Druggist at Lichfield, and died lately, leaving a widow and eight children, is a candidate. In case any Members of the Society should have proxies to spare, we notice the fact. Messrs. Evans and Lescher, 60, Bartholomew Close, receive proxies for this candidate.

Alpha.—From the manner in which the questions are put, we presume the inquirer is not wholly ignorant of the subject, and he ought therefore to be able to solve the problem himself. $Pb\ O$ consists of 104 parts of lead and 8 parts of oxygen, and, therefore, the quantity of oxygen in 111 parts of $Pb\ O$, is as 8 to 112. It is calculated by a rule of three sum thus, $112 : 8 :: 111 : x$. The second question is answered in a similar manner. The suggested answer to the third question is correct.

L. M.—Liquid carmine may be made by dissolving carmine in ammonia.

A Druggist.—The concrete oil of nutmeg, commonly called oil of mace, is sometimes used for promoting the growth of hair.

A. C. (Brighton).—(1). Powdered opium being dry, is, of course, stronger than crude opium, which is moist, and the quantity of moisture being variable, they bear no fixed relation to each other.—(2). The term spiritus stanni is applied to chloride of tin which is used in dyeing, and for many other purposes.—(3). There is no authorized formula for liquor cinchonæ.—(4). Gingerine is the soft oleo-resinous matter obtained by driving off the spirit by a gentle heat from essence of ginger.—(5). As above.

Enquirer (Liverpool.)—See the foregoing.

A. J. (Brighton).—No. 1 resembles the article made by machinery, and No. 2 that made by hand.

P. Q. Z.—The process for making butyric acid is described in Turner's *Chemistry*, and other works of that kind.

W. H. (Chester).—If chloric ether be added to water, the chloroform which it contains, being very sparingly soluble, separates, unless the quantity of water is very great.

A Registered Apprentice (Stockport) applies for instructions how to make *Gunpowder*, which we decline giving him. We have repeatedly published formulæ for writing-ink.

R. F. (Hull)—There are formulæ for coloured fires in Gray's *Supplement.*

T. M. O.—Logwood is sometimes substituted for galls in making ink; but the quality of the ink is deteriorated by it.

Semper.—42 O.P. by Sykes's Hydrometer corresponds to a sp. gr. .866

Simplex.—Fownes's *Manual of Chemistry.*

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Other Communications to the EDITOR (to the care of Mr. CHURCHILL).

LIST

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OF THE

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GEORGE WAUGH.

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Baker, William J.	14, Cornwall Terrace, Camden Town
Ball, Thomas M.	27, St. George's Road, Southwark
Balmer, John	94, St. John's Street Road
Barber, Thomas A.	2, Scott's Place, Islington
Barber, Joseph	7, Orange Street, Red Lion Square
Barclay, John	55, Fore Street
Barron, Charles	6, Giltspur Street
Barry, John T.	Plough Court, Lombard Street

Bartlett, William	1, Brettin Terrace, Chelsea
Barton, Robert D.	95, St. John's Wood Terrace
Bass, William T.	Hornsey Road
Bastick, William	2, Brook Street
Baumborough, William	Wandsworth
Bayley, Edmund	12, High Street, Aldgate
Beaton, John	174, Shoreditch
Bell, Jacob	338, Oxford Street
Bennett, Frederick	85, Goswell Street Road
Bentley, William	11, Mount Street, Bethnal Green
Bevan, Charles F.	77, Hackney Road
Bilton, George	68, Three Colts' Street, Limehouse
Bilton, George	5, Brunswick Street, Blackwall
Binge, Thomas	76, York Street, Westminster
Binnington, Stephen	85, Haymarket
Bird, William L.	42, Castle Street, Oxford Street
Bird, Augustus	22, High Street, Kensington
Bird, Ash Rudd	2, Queen's Row, Brompton
Blake, Charles T.	47, Piccadilly
Bland, John J.	57, Penton Street, Pentonville
Blandford, John F.	9, Bruton Street
Bluett, William R.	190, Sloane Street
Bolton, William T.	12, Wells's Row, Islington
Bond, Henry	11, Cross Street, Hoxton
Boully, Peter	Queen's Road, Bayswater
Bourdas, Isaiah	10, Pont Street, Belgrave Square
Bowden, Edward	Charles Street, St. James's
Bradley, John	10, Pont Street, Belgrave Square
Brewer, Eli	43, Duke Street, Manchester Square
Brooks, Charles	Wandsworth Road
Brown, James	22, Hereford Place, Commercial Road
Bryant, John	Swan Lane, Upper Thames Street
Buck, Thomas	Kingsland Green
Bucklee, William H.	86, New Bond Street
Burcham, Robert P.	14, Albany Street, Regent's Park
Burden, Edward	38, Duke Street, Grosvenor Square
Burden, Thomas	6, Store Street, Bedford Square
Burfield, Henry	180, Strand
Bury, Richard I.	Halkin Street, West
Carne, Charles	13, Caledonian Terrace, Caledonian Road
Chapman, John	7, High Street, Islington
Chase, Thomas	14, Holborn
Clarke, Benjamin	Mare Street, Hackney
Clark, John	Church Street, Hackney
Cobb, Robert C.	10, Frederick Place, Hampstead Road
Cocksedge, Henry B.	520, New Oxford Street
Cole, William H.	101, High Holborn
Coles, John	New Road, Camberwell
Compton, Charles	14, Brewer Street
Constance, William	5, Hanover Place, Regent's Park
Constance, Edward	37, Leadenhall Street
Cooper, William T.	26, Oxford Street
Corfield, Daniel	19, Brick Lane
Court, William G.	282, Regent Street
Cowdery, George T.	36, Paternoster Row
Cox, John	Rye Lane, Peckham
Cracknell, Charles	107, Edgeware Road
Crossley, John	41, Bishopsgate
Croucher, John T.	223, High Street, Shadwell
Cullen, William	37, Beckford Row, Walworth

Dakin, Thomas	73, King William Street
Dakin, Joseph	248, High Street, Poplar
Davenport, John T.	33, Great Russell Street
Davenport, Edward	2, Lower Street, Islington
Davies, Charles	11, Claremont Place, North Brixton
Davies, Edward C.	29, Munster Street, Regent's Park
Davies, Henry E.	43, Wood Street
Davy, Charles	100, Upper Thames Street
Davy, Thomas	Dudley Place, Clapham Road
Deane, Henry	High Street, Clapham
Delatouche, William	147, Oxford Street
Dickinson, William	16, Cambridge Street, Hyde Park
Doughty, Edward W.	4, William Street, Knightsbridge
Down, John	7, Coburg Place, Bayswater
Drew, James	Bush Lane, Cannon Street
Eardley, John	14, Charles Street, Westbourne Terrace
Eddy, Charles W.	30, Crown Street, Finsbury
Edwards, Charles	63, Great Russell Street
Edwards, Joseph	12, New Cavendish Street
Ellis, William	Old Kent Road
Ellis, George H.	Finsbury Pavement
Emery, Frederick A.	High Street, Notting Hill
Evans, John	60, Bartholomew Close
Farmar, Robert A.	40, Westminster Road
Faulconer, Robert S.	Queen's Row, Walworth
Field, Thomas R.	Brecknock Place, Kentish Town
Field, William	27, Queen's Buildings, Brompton
Fincham, Robert	47, Baker Street
Fincham, Zacariah C.	“ “
Fisher, William H.	18, Conduit Street
Forster, Nicholas	105, Holborn Hill
Foulger, Samuel	133, St. George's Street, East
Fowler, Richard	14, Brewer Street
Fox, William	48, Church Street, Bethnal Green
Freeman, John	13, Blackfriars Road
Freeman, Robert	38, High Street, Kensington
French, James	18, Norton Folgate
French, Joseph B.	10, Pall Mall
Gale, Henry	3, Millbrook Street, Camden Town
Galliers, George	230, Tottenham Court Road
Garden, Alexander	372, Oxford Street
Garden, Felix R.	“ “
Garle, John	12, Kensington Terrace, Gravel Pits
Gerard, Philip A.	390, Strand
Gibbs, Nathaniel B.	81, Connaught Terrace, Edgeware Road
Gifford, Joseph	104, Strand
Gigner, John	King's Road, Chelsea
Gill, George W.	15, Crown Place, Walworth Road
Gitsham, William	Hammersmith
Glover, George	19, Goodge Street
Gloyne, Charles G.	5, Terrace, Kensington
Goddard, John	6, Arthur Street, London Bridge
Goff, Henry	Kingsland Road
Goodbarne, Thomas	13, Charles Place, Charles Square
Goodger, David	31, Regent Street
Green, William F.	42, Whitechapel Road
Greenish, Thomas	20, New Street, Dorset Square
Griffiths, John	Clerkenwell Green
Grindle, George	122, Pall Mall
Grindle, John	104, High Street, Southwark

Grounds, David	49, Threadneedle Street
Gunton, Walter G. B.	New Weston Street, Southwark
Hallows, William A.	2, Clark's Place, Islington
Hanbury, Cornelius	Plough Court, Lombard Street
Hanbury, Daniel B.	" "
Hancock, Thomas J.	Earl Street, Finsbury
Harding, John T.	4, Cheapside
Hawxby, Thomas	37, Berner's Street
Hay, Charles G.	35, Charing Cross
Hazell, Robert W.	69, Edgeware Road
Hemingway, Alexander	20, Portman Street
Hemingway, Walter	" "
Henly, John C.	213, Upper Thames Street
Herring, Thomas	40, Aldersgate Street
Herring, William	" "
Herring, Edward	Trinity Street, Southwark
Hewitt, John	Well Street, Wellclose Square
Hewlett, Charles	6, Arthur Street, London Bridge
Hibon, John	Down Street, Piccadilly
Hill, Arthur S.	11, Little Britain
Hill, Lawrence	8, Sloane Square
Hills, Thomas H.	338, Oxford Street
Hockin, Charles	38, Duke Street, Manchester Square
Hodgkinson, Henry	3, Newland Terrace, Kensington
Hodgson, Philip B.	122, Piccadilly
Hooper, Bartlett	43, King William Street, City
Hooper, William	24, Great Russell Street, Covent Garden
Hooper, Hugh H.	22, Commerce Place, North Brixton
Hooper, William	7, Pall Mall, East
Hopkins, Thomas	Newgate Street
Horner, Edward	20, Bucklersbury
Horner, John T.	"
Howard, Robert	Stratford-le-Bow
Howse, William	16, Titchborne Street
Hucklebridge, James M.	103, Upper Ebury Street
Hudson, William B.	27, Haymarket
Hughes, William P.	171, Hoxton Old Town
Humpage, Benjamin	51, Judd Street
Hunt, Henry	1, St. George's Terrace, Islington
Huskisson, William	12, Swinton Street
Huskisson, John	" "
Huxtable, John	104, St. John's Street
Huxtable, William	" "
Ince, William	31, Southampton Street, Strand
Jackson, John	47, Southampton Row
Jackson, William	93, Cheapside
Jackson, James B.	89, Bishopsgate
Jeynes, George W.	42, Princess Street, Edgeware Road
Johnson, Frederick	1, Walter Place, Caledonian Road
Johnson, Robert	17, East Street, Red Lion Square
Jones, Peter	11, Norton Folgate
Jones, Edward	171, High Holborn
Jones, William	34, Tavistock Place, Tavistock Square
Jones, Henry S.	Fulham Road
Keating, Thomas	St. Paul's Churchyard
Kemp, Robert	2, Queen's Place, Holloway
Kemp, Richard	Upper Street, Islington
Kent, Thomas	226, Blackfriars' Road
Langton, Frederick C. B.	226, Upper Thames Street
Large, John H.	2, Holt Place, New North Road

Lawson, William	48, Moorgate Street
Leare, James	High Street, Peckham
Lescher, Joseph S.	60, Bartholomew Close
Lloyd, Arthur	68, Fleet Street
Lloyd, Frederick	Highgate
Lowe, William	47, Blackfriars' Road
Lucas, Thomas	125, Aldersgate Street
Luckombe, Charles C.	86, Snow Hill
Lucy, William	29, Little Newport Street, Leicester Sq.
Mackinlay, George	52, Edgeware Road
Macmurdo, Edward	100, Upper Thames Street
Maitland, John	5, Little Sussex Place, Hyde Park
Maitland, Alexander	8, Torrington Place, Torrington Square
Matthews, Edward S.	111, Guildford Street, Russell Square
Mawby, William	124, Holborn Hill
May, John	Battersea
M'Cullock, William	95, Bishopsgate
M'Cullock, Charles	Covent Garden
M'Lacklan, James	42, Whitechapel Road
Meggeson, George	61, Cannon Street
Moody, James	21, Church Street, Camberwell
Moore, James L.	Craven Street, Westbourne Terrace
Morson, Thomas N. R.	19, Southampton Row
Morton, George	Stratford-le-Bow
Nettleship, Edmond	24, Queen Street, Mayfair
Nind, George	Wandsworth
Oakley, George W.	35, Lamb Street, Spitalfields
Orridge, Benjamin B.	30, Bucklersbury
Parsons, Robert	98, York Street, Westminster
Pasmore, James	Colville Terrace, Pimlico
Pedler, George S.	199, Fleet Street
Penrose, Arthur W.	7, Amwell Street
Peppin, Sydenham H.	25, Princes Street, Leicester Square
Philipps, William T.	2, Spencer Terrace, Lower Road, Islington
Philpot, Henry	32, Praed Street
Pigeon, Richard H.	31, Throgmorton Street
Pigeon, jun. Richard H.	" "
Plummer, George	High Street, Peckham
Pollock, Thomas	129, Fenchurch Street
Potts, Robert U.	55, South Audley Street
Potts, John	" "
Preston, Joseph T.	94, Smithfield Bars
Rea, Edward	115, Wardour Street
Redwood, Theophilus	19, Montagu Street
Reid, Alexander	5, Bathurst Street, Hyde Park
Reynolds, George	271, Bethnal Green Road
Richards, William I. C.	40, New Bridge Street, Blackfriars
Richardson, Benjamin F.	4, Park Terrace, Camden Town
Richardson, George	12, Norland Place, Notting Hill
Roach, Pope	St. James's Street
Rouse, Benjamin R. C.	Wellington Street, Southwark
Rouse, Frederick I.	Clapham Road
Rouse, Robert	1, Wigmore Street
Rowland, Christopher	260, Tottenham Court Road
Sadler, William	13, Norton Folgate
Sainsbury, Samuel	177, Strand
Sandford, George W.	47, Piccadilly
Savory, John	143, Bond Street
Sharpe, George Y.	6, Terrace, Kensington
Sharwood, James A.	Fenchurch Street
Shirley, John G.	97, High Street, Mary-le-bone

Simkin, Edward	2, New Cavendish Street
Simmonds, Joseph	38, Lambeth Walk
Slipper, James	86, Leather Lane
Smith, William F.	12, Keen's Row, Walworth
Smith, George S.	Mornington Terrace, Camden Town
Smith, John	Hampstead
Snowdon, George W.	Basinghall Street
Solly, Stephen F.	3, St. George's Circus, Southwark
Southwood, Thomas S.	Bridge House, Harrow Road
Spencer, George	30, Marchmont Street
Squire, Peter	277, Oxford Street
Squire, William	95, Bishopsgate
Stamper, Ralph	140, Leadenhall Street
Starkie, James	4, Strand
Stead, John M.	213, Upper Thames Street
Steer, Philip R.	Clapton
Stone, William T.	235, Oxford Street
Strange, James	20, Queen's Row, Pimlico
Stuart, John E.	172, Bond Street
Swire, Roger	14, Edgeware Road
Thompson, Henry A.	Clapton
Toller, John	18, Conduit Street
Tonge, George	213, Upper Thames Street
Towerzey, Alfred	10, Glasshouse Street, Regent Street
Travers, James	367, Rotherhithe Wall
Tuck, William H.	1, Grove Street, Mile-end Road
Vincent, Philip	Fulham
Walker, Thomas	48, Tooley Street, Southwark
Walker, Alexander	10, Ireland Row, Mile-end Road
Waller, Arthur	Myddleton Square
Walton, George H.	43, Lamb's Conduit Street
Ward, Francis	14, Grosvenor Street, Pimlico
Warner, Charles H.	55, Fore Street
Watkins, Thomas W.	Hammersmith
Watkins, John	Stratford le Bow
Watlock, John D.	Wandsworth
Watts, John	107, Edgeware Road
Watts, William	Hampstead
Waugh, George	177, Regent Street
Waylatt, Robert	4, Pavement Finsbury
Westall, Richard	Hammersmith
Westwood, William H.	16, Newgate Street
Westwood, Robert	" "
White, John	228, Piccadilly
White, Daniel	19, Terrace, Regent's Park
Wilkes, George	1, Hayfield Place, Mile-end Road
Wilkinson, William	248, Strand
Willmott, William	83, High Street, Southwark
Winstanley, Edward	7, Poultry
Winstanley, Edward N.	"
Winstanley, Henry G.	"
Wooldridge, John	19, Bath Place, New Road
Wyman, John	122, Fore Street
Yarde, Giles	28, Lamb's Conduit Street
Yates, Benjamin	25, Budge Row, Cannon Street

COUNTRY MEMBERS.

Abbott, John F.	Darlington
Abram, Joseph	Dereham
Ackrill, George	Abergavenny
Acomb, John	Knaresborough
Acton, George	Worcester
Adkins, William	Northampton
Ainslie, William	Edinburgh
Albright, Henry	Liskeard
Aldren, John	Lancaster
Allan, George	Chesham
Allan, William	“
Allanson, Charles	Harrogate
Allen, Henry	Bristol
Allen, William H.	Maidstone
Allott, William D.	Sheffield
Althorp, James	Stamford
Amoore, Charles	Hastings
Anderson, Duncan	Edinburgh
Andrews, John B.	Clare
Anthony, Jacob	Bedford
Argles, Henry	Maidstone
Armstrong, Henry	Preston
Arnall, Thomas..	Pontefract
Arnold, Edward	Norwich
Arthy, Joseph	Peterborough
Asling, Brelsford	Spalding
Atkins, Joseph	Alton
Atkins, Francis T.	Deptford
Atkins, John	Deptford
Atkins, Francis T.	Woolwich
Atkinson, Stephen	Doncaster
Atkinson, John T.	Otley
Atlee, David	Brighton
Atterbury, Richard	Northampton
Attwood, George	Brompton
Aubin, James	Jersey
Badcock, John	Barnard Castle
Badcock, John	Brighton
Baëer, Gustave E.	Strasbourg
Bagnall, Thomas	Birmingham
Baildon, Henry C.	Edinburgh
Bailey, William	Wolverhampton
Baines, Richard	Blackburn
Baker, William	Chelmsford
Baker, Charles P.	“
Baker, James B.	Chester
Baker, William	Retford
Baker, Philip P.	Rochdale
Balkwill, Charles	Plymouth
Ball, George V.	Banbury
Ball, Joseph	Birkenhead
Ballard, Edward	Faringdon
Balls, George	Deptford
Bally, Edward F.	Baldock
Baly, Henry	Warwick
Bamford, Thomas	Manchester
Bancroft, John J.	Ruthin
Bane, William	Aylsham
Banester, William T.	Manchester
Banks, Morris	Birmingham
Barge, John B.	Bristol
Barker, William H.	Biggleswade
Barker, William B.	Birkenhead
Barker, Edward N.	Bury St. Edmds
Barker, John M.	Doncaster
Barker, Robert	Salford
Barling, Thomas	Weymouth
Barlow, John	Manchester
Barnard, John	Bath
Barnard, Francis	Yarmouth
Barnes, James	Preston
Barnett, William	Brighton
Barnicott, John	Bridport
Barraclough, Thomas	Leeds
Barron William	Cheltenham
Barry, George	Northampton
Barton, Henry	Brighton
Bassett, Charles	Pontypridd
Bateman, James	Stroud
Bates William J.	Macclesfield
Battle, John R.	Lincoln
Baucutt, Thomas A.	Stourport
Baxter, William	Bromley
Baylis, William	Launceston, V. D. L.
Baynes, James	Hull
Beach, Thomas	Bridport
Beadon, John	Taunton
Beasley, Henry	Uxbridge
Beckett, John	Scarborough
Beech, Joseph	Atherstone
Beedell, Thomas P.	Tiverton
Beer, Joseph	Plymouth
Beesley, Henry	Banbury
Beesley, Thomas	“
Beetham, Michael	Cheltenham
Bell. William D.	Leeds
Bell, Frederick J.	Maldon
Bennett, William	Bath
Bennett, Thomas	“
Bennett, John W..	Leigh
Bennett, George	Newark
Bentham, Isaac	Huntingdon
Benwell, George T.	Uttoxeter
Berry, Edward	Brighton
Best, John D.	Laytonstone
Biggs, Robert	Bath
Binsley, James	Blackburn
Birch, Thomas E.	Mold
Bird, Alfred	Birmingham
Bird, Charles	Worcester
Bishop, Robert	Eye
Bishop, Thomas	Woolwich
Blackhurst, John T.	Preston
Blacklock, William	Brighton
Blacklock, Joseph D.	“
Blackshaw, Thomas	Burslem
Blades, Christopher	Leek
Blades, Holland	Nantwich
Blades, Sherriff	Northwich

Bland, John H.	Stourbridge
Bloor, Joseph	Derby
Blundstone, John	Bristol
Boast, Thomas	York
Boden, Edward	Chester
Bolton, Joseph	Dover
Bolton, Thomas	Tenterden
Bond, Charles	Leamington
Bond, John	Minehead
Bond, John	Yarmouth
Boocock, John	Leeds
Booth, John	Heckmondwicke
Booth, James	Rochdale
Bottle, Alexander	Dover
Bowen, Henry F.	Harrow
Bowerbank, Joseph	Cockermouth
Bowring, John W.	Yeovil
Boyce, John P.	Chertsey
Braddock, William	Oldham
Bradshaw, Robert	Cheltenham
Brailey, Charles	Heavitree
Bramwell, George	Liverpool
Brayshay, William B.	Stockton
Breary, William A.	Douglas
Brelsford, Mark	Oldham
Brelsford, James	“
Bremner, William	Edinburgh
Brend, Thomas	Swansea
Brendon, William E.	Liskeard
Brew, Thomas A.	Brighton
Brewster, William	Cambridge
Brice, James	Pontefract
Bridges, James J.	Pembroke Dock
Briggs, James	Tipton
Bright, Philip	Brecon
Brimelow, Thomas	Farnworth
Broadwater, William	Amersham
Brocklehurst, James	Hyde
Bromley, Charles	Liverpool
Brooke, John	Leeds
Brown, Crowther	Baldock
Brown, Charles	Belper
Brown, William	Dunfermline
Brown, John	Eccles
Brown, Thomas	Lutterworth
Brown, L. Flintoff	Manchester
Brown, William S.	“
Brown, Henry	Oxford
Bryant, John	Ewell
Bryant, William	Huntingdon
Buck, William	Colchester
Buck, George	Rochester
Buckle, Christopher F.	Lynn
Buckley, John	Lees
Buckley, Daniel	Oldham
Buckmaster, Peter	Woodbridge
Bufton, Edward	Manchester
Burbidge, John	Gravesend
Burch, Jeremiah	Halstead
Burdon, John	Durham
Burdwood, James	Plymouth
Burgess, William H.	Dover
Burne, Thomas	Houghton-le-spring
Burthwick, William J.	Penrith
Buss, Thomas	Faversham
Bustin, George	Newcastle
Butler, Samuel	Bristol
Butler, William T.	Frome
Butler, William	Wycombe
Butterfield, James M.	York
Butterworth, John	Manchester
Bwye, George	Cheshunt
Calvert, James	Belper
Calvert, Robert	Stokesley
Caparn, Daniel	Sydney
Carnell, Henry D.	Paignton
Carr, William G.	Berwick
Carr, William	Leicester
Carran, Thomas	Peel
Carter, William	Manchester
Cartman, William	“
Cartwright, William	Newcastle-under-Lyme
Case, Philip	Norwich
Cave, Thomas	Maidstone
Challoner, Edward W.	Newcastle
Chantry, George	Goole
Chaplin, Alfred	Lewes
Chapman, John C.	Congleton
Chapman, Richard J.	Chipping Ongar
Chapman, Edward	Hull
Chaston, Benjamin	Watton
Chater, Jonathan	Watford
Chave, John A.	Uxbridge
Chawner, George	Barton
Cheetham, Henry	Nottingham
Cheney, Holmes	Aylesbury
Chipperfield, Robert	Southampton
Christopher, William	Crickhowell
Clapham, John H.	Leeds
Clark, William	Durham
Clark, John W.	Leicester
Clarke, Thomas M.	Richmond
Clarke, Joseph	York
Clift, Edward	Lewisham
Clutten, Henry	Framlingham
Coates, William	Wakefield
Cockell, William H.	Portsmouth
Cocking, George	Ludlow
Cocks, George E.	Oldham
Colbeck, George R.	Leamington
Cole, Charles E.	Calne
Cole, Walter T.	Weymouth
Coleman, James	Cardiff
Colman, John	Newcastle
Coles, Thomas G.	Frome
Collier, William	York
Collings, William H.	Bristol
Conway, William	Pontypool
Cook, Arthur B.	Ipswich
Cooke, William	Norwich

Cooling, John	Newark
Cooper, Mark W.	Bridlington
Cooper, George B.	Brightlingsea
Cooper, John N.	Bristol
Cooper, George	Exeter
Cooper, Thomas	Leicester
Cooper, George	Reading
Cooper, Thomas	York
Copp, William	Brighton
Coppock, John	Bridport
Corbyn, Joseph B.	Beccles
Cornelius, Richard B.	Teignmouth
Cornish, William	Modbury
Cornish, Henry R.	Penzance
Corrie, Charles	Bedford
Cortis, Charles	Worthing
Cory, Robert C.	Whittlesea
Cotton, Gilbert K.	Barnstaple
Cousins, Thomas G.	Oxford
Coverley, John	Scarborough
Cowell, Silas	Canterbury
Cowell, James	Preston
Cowgill, Brian	Burnley
Cox, Edward	Nottingham
Cox, Arthur C.	Taunton
Crafton, Ralph C.	Croydon
Craske, Samuel	Holt
Crawshaw, Henry	Leeds
Critchley, John	Blackburn
Crocker, Henry, R.	Brighton
Crompton, Robert	Accrington
Crompton, Henry	Bury
Cronshey, James	Thetford
Crook, George	Monmouth
Croome, John	Exeter
Cropper, James	Long Sutton
Cross. William G.	Shrewsbury
Crowther, Thomas	Tickhill
Cubitt, George	Norwich
Cupiss, Francis	Diss
Cutting, Thomas	Selby
Cutting, James B.	Stowmarket
Dale, George	Chichester
Dale, William J.	Portsea
Dalton, Charles	Bury St. Edmds.
Danson, George	Manchester
Davenport, William E.	Edinburgh
Davids, John W.	Seaford
Davidson, John	Berwick
Davie, Cufaude	Yarmouth
Davies, Richard M.	Carmarthen
Davies, Samuel	Chester
Davis, John	Dorchester
Davis, Robert	"
Davis, John O.	Folkestone
Davis, William	Kidderminster
Davis, Henry	Leamington
Davis, Francis	Leominster
Davis, Francis	Newbury
Davison, Ralph	York
Davy, Henry	Wiveliscombe
Davy, Frederick	Yarmouth
Dawe, Sampson R.	Swansea
Deck, Isaiah	Cambridge
Death, John W.	Brompton
Dennison, Matthew	Dudley
Denton, Thomas	Halifax
Dickerson, Henry	Devonport
Dickins, Rowland	Aylesbury
Dingley, Richard L.	Maidstone
Dixon, Frederick	Ash
Dobinson, William	Sunderland
Dodman, Robert	Thorney Abbey
Dodshon, John	Stockton
Dodshon, Edward	Sunderland
Dores, James	Alnwick
Doubell, James	Hawkhurst
Dowell, James	Birmingham
Dowell, William C.	Bristol
Down, Richard H.	Torpoint
Drage. William F.	Birmingham
Dresser. Richard	York
Dron. William	Kirkaldy
Duck, Daniel	Guisborough
Duckett, Joseph B.	Bradford
Dudden, Henry M.	Midsomer Norton
Duggan, Henry S.	Hereford
Duncan, John	Edinburgh
Duncan, Frederic	Sandwich
Dunger, John	Ipswich
Dunhill, William	Doncaster
Dutton, John	Birkenhead
Dutton, George	Bolton
Dyer, Thomas	Exeter
Dyson, John	Andover
Edge, William W.	Tunstall
Edwards, George	Dartford
Edwards, Henry	Lincoln
Edwards, John B.	Liverpool
Eliot, Samuel	Liskeard
Ellaby, John	MeltonMowbray
Ellis, Andrew	Ryde
Ellis, Benjamin	Shepton Mallett
Ellis, Richard	Thornbury
Ellison, John	Liverpool
Elsey, John	Horncastle
Ely, George	Bingham
Emlyn, William O.	Guildford
England, William P.	Huddersfield
Ereaut, John	Jersey
Etherington, Joseph	BishopAuckland
Evans, Thomas	Aberdare
Evans, Edwin P.	Cleobury Mortimer
Evans, John	Hemel Hempstead
Evans, Edward	Liverpool
Evans, Thomas B.	"
Evans, Richard	Oswestry
Eyre, Alfred B.	Ipswich
Eyre, Thomas S.	Launceston

Fairbank, James H.	Woolwich
Fairley, Robert	Sunderland
Fairweather, John	Newcastle
Falshaw, John	Haslingden
Falshaw, Thomas	“
Farmer, John	Ashford
Farmer, James	Castle Donington
Farmer, John	Putney
Farrant, John G.	Brentford
Farrant, Henry	Ottery St. Mary
Farrant, Robert	Salisbury
Fawcett, Benjamin	Newcastle
Fendick, Robert	Bristol
Ferris, Richard	“
Fielder, Thomas W.	Newbury
Fielder, Thomas	Warminster
Finch, John	Cheltenham
Finch, Jacob	Swaffham
Finemore, William F.	Plymouth
Fisher, William	Liverpool
Fison, James	Wymondham
Fitch, Robert	Norwich
Fitt, Edward	Barking
Flecknoe, Josiah	Leamington
Fleeming, William	Wolverhampton
Fletcher, Francis	Cheltenham
Fletcher, Cornelius	Nottingham
Fleurot, Emile	Mauritius
Flockhart, William	Edinburgh
Foggitt, Thomas J.	Thirsk
Forbes, William	Reigate
Ford, Joseph	Wolverhampton
Forster, Robert	Dover
Foster, Frederick	Brighton
Foster, Joseph	Collumpton
Foster, Henry J.	Coventry
Foster, James F.	Hull
Foster, Edward	Ludlow
Foulds, William	Chowbent
Fowke, George	Stafford
Fowke, William	“
Fox, Charles J.	Witney
Foxwell, Eusebius	Wootton-under-Edge
Francis, George	Woodbridge
Freestone, Thomas M.	Bristol
French, Gabriel	Chatham
Froom, William J.	Exeter
Froud, James	Dorchester
Fryer, Henry	Huddersfield
Fuller, James	Bristol
Furmston, Samuel C.	Dartford
Gale, John	Berkhampstead
Galpin, Walter	Crewkerne
Gamble, Richard	Grantham
Garbutt, Cornelius	Newcastle
Gardener, Charles	TunbridgeWells
Gardner, James	Edinburgh
Gardner, John	Guildford
Garle, William	Uttoxeter
Garlick, Thomas H.	Halifax
Garnham, Barrington	Brighton
Garratt, John C.	Rugby
Garside, Francis B.	Southport
Gascoigne, George	Harrogate
Gaskell, William J.	Newton Abbott
Gay, George	Stroud
Geldard, Richard K.	Plymouth
Geldard, John	St. Austell
George, William J.	Stratford-on-Avon
Gibbons, Williams	Plymouth
Gibson, William	Newcastle
Giles, Richard B.	Bristol
Giles, William R.	“
Gilkes, William	Leominster
Gill, Samuel	Salford
Gill, William	Tavistock
Gillard, Thomas	Ashburton
Gilpin, Benjamin	Newcastle
Gilpin, James	“
Glaisby, John	York
Glaisyer, Thomas	Brighton
Glaisyer, John H.	Southampton
Glover, Samuel	Liverpool
Gloyne, Thomas H.	Dewsbury
Goadsby, Thomas	Manchester
Goddard, Joseph	Leicester
Goddard, Henry E.	Yarmouth
Goodall, Henry	Derby
Goodall, Thomas	Ensham
Goodall, John	Market Drayton
Goodall, John	Newcastle
Goodbarne, Thomas R.	Rio de Janeiro
Goode, Thomas	Congleton
Goodson, Joseph	Beeston
Gordelier, Paul W. G.	Sittingbourne
Gow, Alexander	Wolverhampton
Gray, William	Rothwell
Greaves, John	Bakewell
Greaves, William	Knottingley
Greaves, Richard	Ripon
Green, William	Bath
Green, George	Bolton
Green, John	Donington
Greenwell, William C.	Newcastle
Greenwood, John	Harrogate
Griffith, Richard	Slough
Griffiths, Charles	Weston-super-Mare
Grimmer, Samuel	Norwich
Grindley, John	Chester
Groves, Simon	Blandford
Groves, Richard	Weymouth
Grounds, Ambrose	Ludlow
Gulliver, Walker J.	Lutterworth
Gundry, William	Bristol
Gunner, George	Winchester
Gurnell, Thomas	Dartford
Guy, Guy	Helstone
Gwatkin, James T.	Brighton

Hadfield, William	Congleton
Hadfield, William	“
Hadfield, Joseph	“
Hagley, William T.	Ilminster
Haines, John J.	Bromsgrove
Hall, Thomas	Grantham
Hall, George	Huddersfield
Hall, William	Northwich
Hall, Joseph	Salford
Hall, Thomas	Truro
Hall, John D.	Wycombe
Hallam, Edward	Axbridge
Hallett, John	Plymouth
Hallsworth, Thomas	Manchester
Ham, James	Exeter
Ham, Charles H.	“
Hambly, George	Stonehouse
Hambrook, Odden	Dover
Hammon, Richard	Folkestone
Hargraves, James	Oldham
Harmer, John D.	Ipswich
Harold, William	Battle
Harper, Henry	Leamington
Harper, George	Norwich
Harris, George	Luton
Harrison, Thomas	Bradford
Harrison, James P.	Carlisle
Harrison, William R.	Dorking
Harrison, John	Nottingham
Harrison, Thomas	“
Harsant, William	Epsom
Harsant, Theophilus	Gosport
Hart, James	Bolton
Hartland, James	Bristol
Hartley, Edward	Matlock
Harvey, Thomas	Leeds
Harvey, John	Newark
Haselar, Albert	Cranbrook
Hassall, John T.	Derby
Hatfull, Robert	Deptford
Hathaway, Richard J.	Bristol
Hattersley, John	Barton
Havill, Paul	Torquay
Hawkin, John	Masham
Haworth, David	Manchester
Haydon, Henry W.	Dawlish
Haydon, Frederick W.	Fordingbridge
Hayles, Benjamin	Ealing
Hayward, Edward	Ipswich
Hayward, William G.	Reading
Head, John	Lewes
Headley, Morris	BurlingtonQuay
Hedderley, John	Nottingham
Heald, William	Sleaford
Heath, Edward	Cromer
Heath, Augustus E.	Liverpool
Heathcote, Thomas S.	Newcastle-under-Lyme
Heaton, John S.	Manchester
Hellowell, Daniel	Leeds
Heming, Richard G.	Worcester
Hempstead, Robert	St. Leonard's
Henson, Matthew	Watford
Hepton. William	York
Hern, William H.	St. Austell
Hewitt, George A.	Derby
Hibbert, Walter	Neath
Hick, Joseph	Bradford
Hick, Matthew B.	Wakefield
Hick, Allan	Wath-upon-Deane
Hickman, Joseph F.	Newbury
Higgs, John	Maidenhead
Higgs, John S.	Market Harboro'
Higgins, William	Chester
Higgins, Charles	Liverpool
Higginson, Henry	Audlem
Highway, Henry	Walsall
Hill, Richard	Bruton
Hill, John	Sheffield
Hill, Thomas	Leatherhead
Hine, Richard	Beaminster
Hiron, Henry	Evesham
Hiscock, George D.	Taunton
Hitchcock, Charles E.	Colchester
Hitchcock, William R.	Taunton
Hobbs, William S.	Cambridge
Hodder, Henry	Bristol
Hodgson, Edward	Stockton
Hodgson, James	Reading
Holden, James	Burley
Holdsworth, Mark	Horncastle
Hollick, Thomas	Chatham
Hollier, Elliott	Dudley
Holt, John	Oldham
Holttum, Edward	Canterbury
Holyoake, William	Manchester
Hooper, Henry	Brighton
Hope, John	Chester
Hopkins, William F.	Henley-in-Arden
Hopkinson, William	Manchester
Hopwood, Henry	Richmond
Horncastle, Henry	Sheffield
Horner, Stephen	Hartlepool
Hornsby, John H.	Odiham
Howard, John	Manchester
Howe, Joseph	Stony Stratford
Howman, Philip	Winchcombe
Howorth, James	Doncaster
Hudson, Richard	Kendal
Hudson, George	South Shields
Huggins, George T.	Barnet
Hughes, Edward	Altrincham
Hughes, Samuel	Stourbridge
Hulbert, Robert S.	Basingstoke
Humphreys, Matthew	Nottingham
Huntley, John	Wimborne
Hurst, William T. H.	Abergavenny
Hurworth, Thomas B.	York
Husband, Matthew	Exeter
Ingledew, Thomas	Braintree
Isherwood, Joseph	Preston
Jackson, William R. P.	Ewell

Jackson, William G.	Hartlepool
Jackson, Edward	Lancaster
Jackson, Robert	Manchester
Jackson, Thomas	"
James, John	Truro
Jardine, Edward	Liverpool
Jeffery, Moses W.	Devonport
Jeffery, Moses W.	"
Jenkins, Henry M.	Christchurch
Jenner, Richard B.	Sandgate
Jennings, William	Halifax
Jennings, Reginald	Hereford
Jennings, John E. H	Sheffield
Jerrems, John	Durham
Job, Richard O.	Truro
Johnson, Benjamin	Bromsgrove
Johnson, John H.	Liverpool
Johnson, Samuel	"
Jones, Charles	Birkenhead
Jones, Edward B.	Carmarthen
Jones, Edwin	Ewias Harold
Jones, Charles	Hanley
Jones, John	Holywell
Jones, Samuel U.	Leamington
Jones, William	Liverpool
Jones, Robert	Manchester
Jones, James	Newcastle
Jones, John	Romsey
Jones, James	Salford
Jones, William A.	Waterloo
Jones, Oliver E.	Welchpool
Jones, John	Worksop
Judson, Thomas	Ripon
Jull, Thomas	Braintree
Keeling, George R.	Epsom
Keen, Benjamin	Hungerford
Kelland, Richard	Greenwich
Kemp, Grover	Brighton
Kemp, William	Horncastle
Kendall, George	Masham
Kendall, Frederick	Stratford-on-Avon
Kernot, Joseph	Naples
Kernot, Septimus	"
Kershaw, James	Southport
Kimbell, Henry	Knowle
Kinch, Charles	Henley-on-Thames
Kinch, Francis	Margate
King, Joseph R.	Bath
King, Thomas S.	Rochester
Kirby, William	York
Kirkham, Thomas	Bury St. Edmds.
Kirton, Joseph B.	Hull
Kitchen, John	Macclesfield
Kitching, Charles	Haverhill
Knight, Edward S.	Bridport
Knight, Alfred	Cirencester
Knight, John M.	Rochester
Knott, Thomas	Exeter
Knowles, Richard J.	Demerara
Knowsley, Robert	Driffield

La French, George	Bolton
Lamusse, Louis A.	Mauritius
Land, John	Leeds
Langford, William	Frome
Lansdale, Ralph	Wycombe
Large, Henry	Nottingham
Lathbury, Robert	Liverpool
Lavers, Thomas H.	Lewisham
Lay, William R.	Norwich
Laycock, Henry	Rotherham
Lea, Henry C.	Hastings
Lea, John W.	Worcester
Leaker, John	Taunton
Leay, Joseph	Birmingham
Lediard, Charles	St. Vincent
Leggatt, George	Guildford
Leggett, John T.	Wareham
Lett, William	Manchester
Lewin, William	Plymouth
Lewis, John	Blackburn
Liddon, George	Teignmouth
Liddington, George	Bilston
Lindsay, Robert	Edinburgh
Lines, George	Hertford
Linsley, Thomas	York
Lister, George	Cottingham
Lloyd, Edmund	Richmond
Lockyer, George	Deptford
Lodge, Thomas	Torquay
Lofthouse, James	Hull
Longman, Robert	Sherborne
Longstaff, John	Keswick
Lovell, John	Gloucester
Lowe, Thomas	Liverpool
Lowndes, Hervey	Stockport
Loye, Philip	Plymouth
Lynch, John R.	Manchester
Mabson, William	Yarmouth
Macbean, David	Elgin
Macfarlane, John F.	Edinburgh
Macgowan, John T.	Leeds
Machon, Frederick	Sheffield
Mackay, John	Devonport
Mackay, John	Edinburgh
Maddock, William	Tunbridge Wells
Maddocks, Samuel	Liverpool
Maggs, Thomas C.	Kelveden
Maggs, Samuel B.	St. Leonard's
Mahon, John	Bristol
Mailloux, Joseph	Mauritius
Maleham, Henry	Sheffield
Maling, William	Newcastle
Manfield, John W.	Salford
Manthorp, Samuel	Colchester
March, William	Newark
Marchant, Charles F.	Ipswich
Marder, James W.	Lyme Regis
Markland, Edwin	Yarmouth
Marks, George	Bradford
Marrison, George O. R.	Calne
Marsh, William	Biggleswade
Marshall, John F.	Gainsborough

Marshall, James W.	Waltham Abbey
Marston, Richard	Ludlow
Martin, John	Bristol
Martin, James	Deptford
Martin, Edward W.	Guildford
Martin, Thomas	Lewes
Martin, Charles	Strood
Martindale, Richard	Carlisle
Mason, William W.	Manchester
Maunder, Frederick	Sheffield
May, Charles	Reading
May, Enoch	Tewkesbury
Maynard, Henry R.	Burnham
Mays, Robert J. F.	South Shields
McLeod, Alexander	Enfield
McNiel, John	Trowbridge
Meadows, John	Market Harboro
Mease, Solomon	North Shields
Meatyard, Robert	Basingstoke
Medcalf, Ebenezer	Tooting
Medwin, Aaron	Greenwich
Melson, John	Hull
Mennie, George	Plymouth
Merrick, Thomas J.	Northampton
Merryweather, Henry	Sheffield
Metcalf, John C.	Leeds
Miller, Charles	Oxford
Miller, Robert T.	Reading
Miller, John	Tunbridge Wlls
Millns, Francis	Spalding
Mills, Thomas	Bakewell
Mills, Robert M.	Bourne
Mitchell, John	Manchester
Mole, William T.	St. Neot's
Monro, Henry	Newcastle
Moody, Henry	Alresford
Moor, Joseph	Bury St. Edmds.
Moore, John	Blackpool
Moore, Richard C.	Brighton
Moore, Henry	Worcester
Mordaunt, Alfred	Southampton
Morgan, Benjamin	Llandilo
Morris, Alfred P.	Stourbridge
Morse, Charles B.	Bp. Stortford
Morse, George	Mortlake
Morton, Honry	Ramsgate
Moscrop, Edward H.	Godalming
Moss, William	Carlisle
Mount, John	Manchester
Mullett, Charles	Ilminster
Mumbray, Robert G.	Manchester
Murdoch, James	Glasgow
Muriel, Henry B.	Brighton
Muskett, Charles	Diss
Muskett, James	Harlestone
Musson, Telemachus, G.	Worcester
Myers, John	Newcastle
Naftel, Thomas P.	Guernsey
Napier, James	Edinburgh
Negus, Samuel	Northampton
Neeves, Benjamin	Horsham
Nettleship, Henry	Leicester
Nettleship, Thomas	Lincoln
Newman, Thomas	Hartley Row
Newton, Christopher	Edinburgh
Nichol, Anthony	Newcastle
Nicholls, James	Stourbridge
Nielson, Francis E.	Buxton
Nightingale, Joseph S.	Basford
Nightingale, Henry L.	Egham
Noakes, Richard	Brighton
Nobrega Gerardo I. de	Madeira
Northcroft, Jonathan	Esher
Nunn, John V.	Bury St. Edmds
Oakey, John M.	Preston
Olding, George F.	Portsea
Oliver, William L.	Coggleshall
Orange, John	Portsea
Ord, John W.	Sunderland
Otter, William	Bloxham
Outhwaite, William T.	Bradford
Overbury, Henry	Alcester
Owen, Griffith	Carnarvon
Owen, George	Dublin
Owen, David	Dudley
Owen, Henry	Manchester
Owen, William	Newcastle
Owles, James	Bungay
Owles, John	Yarmouth
Oxley, Frederick	Epsom
Packard, Edward	Saxmundham
Pain, George A.	Cambridge
Paine, William	Canterbury
Paine, John S.	Brighton
Palethorpe, Samuel	Nottingham
Palin, Benjamin	Sunderland
Palk, John	Exeter
Palk, Edward	Southampton
Palmer, Faithful	Cheltenham
Palmer, Thomas J.	East Grinsted
Palmer, William	Leicester
Parker, Edward	Carlisle
Parker, Thomas	Halifax
Parkes, Joseph	Atherstone
Parkes, Thomas	Woolwich
Parkinson, Thomas	Liverpool
Parnell, John	Peterborough
Parrott, Augustus F.	Twickenham
Parsons, Thomas	Leicester
Parsons, John H.	Newton Abbott
Parsons, John	Ottery St. Mary
Parsons, William	Portsmouth
Parsons, Edward	Wellington
Paul, Horace	Halsted
Payne, Reuben C.	Bridgewater
Payne, George	Cowes
Pearce, George	Bristol
Pearce, Thomas	Gloucester
Pearson, Charles J.	Swansea
Peart, David	Ewell
Peat, Walter	Fareham
Perrins, William	Worcester
Perry, Solomon	Tavistock
Phillips, William	Luton

Phillips, Thomas	Wincanton
Philpott, John	Bromyard
Phythian, John W.	Salford
Pickbourn, John	Doncaster
Pickering, Henry	Leicester
Pickup, Thomas H.	Blackburn
Pickup, John	Manchester
Pickup, Varey	Salford
Pierce, Edward L.	Shelton
Plomley, James F.	Rye
Pocklington, James	Sydenham
Pooley, John C.	Bath
Portello, William F.	Farnham
Portway, John	Bury St.Edmds.
Powell, John	Shaftesbury
Powell, Edward	Winchester
Power, John H.	Cheltenham
Pownall, John	Salford
Poynton, Edward H.	Bristol
Prance, James C.	Maidstone
Pratt, John	Bradford
Pratt, John	Chichester
Pratt, Edmund	Leamington
Prescott, John	Liverpool
Priestley, John	Liverpool
Prockter, Richard E.	Cheltenham
Procter, William	Liverpool
Proctor, William	Newcastle
Proctor, William	"
Prout, Robert	Milton Abbott
Pruddah, William	Hexham
Purdue, Thomas	Bexley Heath
Quincey, James C.	Lynn
Race, William	Manchester
Radley, William V.	Sheffield
Raimes, Richard	Edinburgh
Ramskill, Parson	Leeds
Randall, Edward M.	Southampton
Randall, William B.	"
Rankin, William	Kilmarnock
Ransford, Samuel	Cleveden
Ransome, George	Ipswich
Rastrick, John A.	Woolwich
Rastrick, Joseph L.	Southsea
Raw, John	Preston
Rawle, William	Liverpool
Reading, Robert G.	Warwick
Readman, William	Leighton-Buzz
Redfern, John	Ashby-de-la-Zouch
Reeve, William	Canterbury
Reeves, Walter W.	Tunbridge Wells
Reinhardt, Johaan C.	Hull
Reinhardt, George	Leeds
Reinhardt, William	"
Rendall, John M.	Torquay
Reynolds, William	Halesworth
Rhodes, Frank	Hampton
Richardson, Samuel	Beaconsfield
Richmond, Robert	Leighton-Buzz.
Ridsdale, James	Wetherby
Ringrose, Blanshard	Leeds
Ritson, John	Sunderland
Ritson, John G.	Sunderland
Ritson, Thomas	"
Roberton, James	Manchester
Roberts, Charles	Bath
Roberts, John B.	Bourn
Roberts, Henry	Florence
Roberts, Charles D.	Ryde
Roberts, Albinus	St. Albans
Roberts, George M.	Shaftesbury
Robinson, Benjamin	Alford
Robinson, James M.	Beverley
Robinson, Charles L.	Hull
Robson, George	Durham
Robson, John	Louth
Roe, Thomas	Ollerton
Roe, Septimus	Salisbury
Rogers, Henry	Bombay
Rogers, William	Honiton
Rogers, John	Ledbury
Rogerson, Michael	Bradford
Roper, Henry	Oundle
Roper, William G.	Sheffield
Ross, Stephen	Lancaster
Rothwell, Jesse	Rochdale
Rowe, John	Plymouth
Rowland, Benjamin C.	Liverpool
Russell, Thomas	South Shields
Sabine, John	Bury St. Edmds.
Salisbury, John M.	Sheffield
Sanders, Henry W.	Bristol
Sanders, George L.	Tiverton
Sandiland, John R.	Bicester
Sanford, John R.	Rio de Janeiro
Saunders, David P.	Haverfordwest
Savage, William D.	Brighton
Sawyer, James	Carlisle
Sawyer, Thomas	Ramsgate
Schacht, George F.	Clifton
Score, William	Bristol
Scowcroft, John	Bolton
Seaton, George	Chelmsford
Seaton, John L.	Hull
Sefton, Abraham	Church
Selfe, Isaac	Bristol
Severs, Joseph	Kendal
Sewell, James	Leeds
Sewell, James C.	Sheffield
Seyde, John F.	Wolverhampton
Shackel, John M.	Maidenhead
Sharp, Henry	Christchurch
Sharp, Joseph	Salford
Sharples, William	Preston
Sharples, George	"
Shaw, James	Bury
Shaw, John	Edinburgh
Shaw, Charles W.	Liverpool
Shaw, Alexander H.	Stockport
Shawcross, William	Stockport
Shepard, William	Market Harboro'
Shepperley, James	Nottingham
Shillcock, Joseph B.	Bromley
Shingles, George S.	Yarmouth
Shipley, John	Reading

Short, William	Lyndhurst
Shrimpton, Charles	Cheltenham
Shum, Henry	Brecon
Silvester, Joseph	Knutsford
Simmons, Frederick	Worcester
Simonds, William	Boston
Simpson, John	Hull
Simpson, Thomas	Stowmarket
Singleton, John	Devonport
Sinimberghi, Nicholas	Rome
Sirett, George	Buckingham
Slade, Daniel D.	Leicester
Slade, Robert	Tenbury
Slater, William B.	Blackburn
Slater, William H.	Romsey
Sloper, Frederick E.	Tenby
Smallpage, Isaiah	Burnley
Smallwood, John W.	Macclesfield
Smeeton, Edward	Leeds
Smeeton, Edward W.	"
Smith, William	Abingdon
Smith, James	Barnet
Smith, John H.	Carmarthen
Smith, Nathaniel	Cheltenham
Smith, Thomas	Colchester
Smith, Henry	Edinburgh
Smith, William	Nailsworth
Smith, Joseph de C.	Norwich
Smith, Richard B.	"
Smith, Samuel	Plymouth
Smith, John	Portsmouth
Smith, William	St. Andrews
Smith, William	Shields, North
Smith, William	Sutton Coldfield
Smith, Alfred	Tenterden
Smith, William	Woolwich
Snape, Edward	Birmingham
Snelling, Francis	Horsham
Snow, James	Newark
Soper, Eliœnai	Plymouth
Southall, William	Birmingham
Southall, Thomas	"
Southall, William	"
Southern, Samuel	Usworth
Sowerby, John	Carlisle
Sparks, John	Bombay
Spence, Joseph	York
Spencer, Charles	Gravesend
Spencer, William	Monmouth
Spettigue, Joseph	Launceston
Spong, Thomas W.	Biggleswade
Squarey, Newell V.	Salisbury
Squire, William	Hanwell
Squires, Samuel	Cambridge
Standring, Thomas	Manchester
Stantial, John	Corsham
Stanton, Samuel	Thrapston
Staveley, Mark	Leeds
Stead, William	Wakefield
Steele, Stephen	Brighton
Steele, Thomas	Bath
Stevens, John	Wednesbury
Stevenson, Richard	Derby
Steward, Josiah	Kidderminster
Steward, Theophilus	"
Steward, William	"
Steward, Charles	Yarmouth
Stewart, F. H.	Demerara
Stiell, Gavin	Dunfermline
Stone, Charles P.	Manchester
Stott, William	Sowerby Bridge
Strange, Charles	Manchester
Strawson, Henry	Gravesend
Stuart, Charles	Woolwich
Sturton, John	Peterborough
Stutchbury, Joseph S.	Demerara
Sumner, William	Birmingham
Sutton, Thomas	Wolverhampton
Swan, Walker	Newcastle
Symonds, John	Aylsham
Tabrum, James A.	Brighton
Tadman, Peter L.	Sittingbourne
Tanner, Nicholas W.	Exeter
Tarzewell, Richard	Braintree
Tatham, John W.	Barnstaple
Tayler, William H.	Warminster
Taylor, Henry	Godalming
Taylor, James	Manchester
Taylor, Thomas H.	"
Taylor, Sydney	Pendleton
Taylor, George	Preston
Taylor, Edward	Rochdale
Taylor, John U.	St. Ives
Taylor, Thomas	Staleybridge
Taylor, Stephen	Westbury
Teear, John M.	Leicester
Teasdale, Thomas	Darlington
Telfer, Frederick	Oxford
Theobald, Peter B.	Leighton Buzz.
Thomas, John H.	Boston
Thomas, Richard	Burnley
Thomas, Thomas	Ilfracombe
Thompson, James	Brentwood
Thompson, Andrew	Carlisle
Thompson, William	Durham
Thompson, George	Liverpool
Thompson, John	Liverpool
Thompson, Henry	Middlesborough
Thompson, Edward	Otley
Thompson, Thomas	Richmond
Thompson, John	Thirsk
Thornton, Samuel	Exmouth
Tiernan, Edward	Liverpool
Tinker, Edward	"
Tomlinson, Charles K.	Lincoln
Tonge, James S.	York
Tozer, Richard J.	Exeter
Tribe, John	Chatham
Trix, John	Exeter
Trueman, William	Durham
Trumper, Richard	New Ferry
Tuck, Buckmaster	Wycombe
Tucker, Charles	Bridport
Tucker, Robert R.	Worcester
Tully, James E.	South Shields
Tunley, John	Bromwich

Turner, Edward H.	Buckingham
Turner, Thomas	Newcastle-under-Lyme
Tylee, John P.	Bath
Visick, Robert G.	Exeter
Wagstaff, John H.	Northampton
Wain, William	Nottingham
Wainwright, James	Howden
Waite, Joseph	Cheltenham
Waites, Henry	Ross
Walker, Henry J.	Bath
Walker, Edward H.	Doncaster
Walker, George C.	“
Walker, Robert	Maidenhead
Walker, William	Malmsbury
Walker, James	Melrose
Walker, Edward	Newcastle
Walker, John	Shields, South
Walker, William H.	Southport
Walkinton, William	Tenby
Wall, William	Tottenham
Wallis, Ebenezer	Hull
Walton, Ralph	Sunderland
Walton, John	“
Warburton, Thomas	Bolton
Warburton, James	Farnworth
Ward, James	Falkingham
Ward, John D.	Manchester
Ward, James	Richmond
Ward, William	Sheffield
Warren, James	Landport
Washford, Jeremiah	Warehorn
Waterson, John	Birmingham
Watkins, George H.	Walsall
Watson, Edward M.	Bristol
Watson, Henry	Cambridge
Watts, Henry	Chatham
Wearing, Richard	Liverpool
Weatherill, Lawrence	Stokesley
Weaver, Frederick	Wolverhampton
Weeks, Caleb	Torquay
Weller, George	Windsor
Wellington, James M.	Oakham
Wellington, Fred. G. N.	South Petherton
Welsford, Frederick M.	Brighton
West, Isaac	Oxford
Wheeler, John	Chipping Sodbury
Wheeler, Robert	Guildford
Wheeler, James E.	Ryde
Whelpton, John	Stalbridge
Whimpray, John	Lancaster
Whinfield, William H.	Kingston
White, Thomas	Bilston
White, Robert K.	Dursley
White, George	Havant
White, Henry	Leamington
White John A.	Manchester
White, Luke P.	Peniston
Whitehead, Edwin	Sheffield
Whitfield, John L.	Worcester
Whitfield, John	“
Whitlock, Edwin	Salisbury
Whitton, George	Horncastle
Wibmer, Lewis M.	Tunbridge
Wick, James	Hadleigh
Wick, John	Sheffield
Wickham, William	TunbridgeWells
Wigg, John G.	Lynn
Wiggin, John	Ipswich
Wilde, Eli	Manchester
Wilkes, William	Bromyard
Wilkes, Tyers D.	Upton-on-Severn
Wilkinson, William	Manchester
Wilkinson, John	Sheffield
Willerton, Thomas	Coventry
Williams, William N.	Farnham
Williams, John	Llandilo
Williams, Thomas	Mold
Williams, William	Nottingham
Williams, David	Pwllheli
Williams, John	Tipton
Williams, Charles	Wellington
Williamson, James	Hunslet
Wilson, Robert	Berwick
Wilson, Thomas	Bradford
Wilson, Joseph	Canterbury
Wilson, Edward	Lancaster
Wilson, Charles T.	Swansea
Windeatt, John	Dartmouth
Winder, Thomas	Manchester
Wine, John	Bristol
Wing, Thomas N.	MeltonMowbray
Wise, Thomas	Kidderminster
Witherington, Thomas	Worcester
Withers, Richard	Blackwater
Wood, Henry	Brentford
Wood, Eli	Mossley
Wood, James	Nottingham
Wood, William W.	Pontypool
Wood, Edwin	“
Woods, William	Worcester
Woodward, Thomas	Leicester
Wooldridge, Thomas	Windsor
Woolley, James	Manchester
Woolley, Daniel	Stockport
Wootton, William	Wolverhampton
Wreaks, Thomas P.	Glossop
Wreaks, Georgs D.	Sheffield
Wright, George W.	Macclesfield
Wright, Charles	Manchester
Wright, John J.	Sheffield
Wylde, James	Manchester
Wylde, John	“
Wyley, John	Coventry
Yates, Thomas	Wickham Makt
Young, Thomas	Bradford
Young, Uriah	Cheltenham
Young, John	Sunderland

By order of the Council,

January 1*st*, 1851. GEORGE WALTER SMITH, *Secretary*.

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. VIII.—FEBRUARY 1st, 1851.

THE PROGRESS OF THE ARRANGEMENTS FOR THE GREAT EXHIBITION OF 1851.

The functions of the Chairmen and Deputy Chairmen of the Sectional Committees have merged into the Central Executive, and the local preliminaries being settled, the next step to be accomplished, is the general arrangement.

We are not yet able to report in detail the prospects of the Chemical and Pharmaceutical Sections, but it is ascertained that some first class specimens of chemicals are prepared, or in process of completion. This is also the case with the Materia Medica specimens, some of which will be exhibited in a series, showing the varieties which are found in the British and foreign markets.

SANITARY REFORM.—THE WINDOW-DUTY.

It was confidently believed that the repeal of the tax on light and air would have taken place last session. The ministers had admitted that no measure having sanitary reform for its object could be effectual, while the window-tax remained in force. They had declared themselves to be sanitary reformers; and the public, trusting to empty words, anxiously waited almost in silence for the fully expected measure.

But the ministers, hearing no blasts of discontent, feeling no pressure from without, and being urged by the builders, left the window-duty intact, and repealed the duty on bricks; thus offering an additional premium on the obstruction of light and air, by reducing the price of the material used for stopping up windows.

The public indignation is now raised to the boiling point. The metropolis is in a state of ferment on the subject. Meetings are convened in every district, and petitions are in course of signature in almost every street. Similar proceedings are in progress in the provinces, and ought to be energetically carried on in every town in the kingdom. It is an occasion on which the Chemists might creditably exert themselves in their several localities; for no class of men are better able to appreciate the value of light and of fresh air and the pernicious results of obstructed ventilation. Petitions from the Medical Practitioners in each town or district would have much influence.

There never was a more favourable opportunity for storming the fortress of oppression and malaria, and enlightening the darkness of doubting ministers. The people are unanimous from one end of the kingdom to the other. This unanimity should be shown in black and white. A petition should be sent in not only from every town, but from every street in the United Kingdom. These petitions should be presented by fifties or hundreds, commencing on the fourth of February, and repeating the dose *daily* until it operates.

A WRINKLE FOR THE HOMŒOPATHS.

When we suggested in our last number as a parallel absurdity to certain practices enumerated, the administration of the microscopic itch insect, clad in sugar, as a cure for the itch, we did not suppose that this was actually done. We were not aware that the "scrapings" of disease from patients affected with itch are positively triturated with sugar of milk, and manipulated as an internal remedy for administration to patients having that disorder, on the principle "*similia similibus curantur.*" Such, however, we are informed, is the fact!

In another part of this number will be found a figure of the *acarus sacchari*, an insect occuring in some descriptions of raw sugar, and supposed to give rise to the grocers' itch, as stated in our last number. Here is another opportunity for the homœopathic confectioner to benefit mankind by preparing these vermin *secundum artem*, as an internal remedy for this troublesome disease. One circumstance noticed by Mr. Erasmus Wilson might seem to militate against this proposition, namely, that some of those who suffer from the disease are in the habit of tasting the sugar containing the insect, which, according to the doctrine "*similia similibus*, &c." ought to act as a cure. To this the homœopaths have a ready answer. The efficacy of their remedies depends, they say, upon the trituration and the infinitesimal minuteness of the dose; and even if it were demonstrated that in large doses the vermin aggravate the disease, a portion of one of the insects, properly triturated, prepared like a sugared almond and placed upon the tongue, might, according to their theory, effect a cure.

When Job was afflicted with "sore boils from the sole of his foot unto his crown," "he took him a potsherd to scrape himself withal." Such a patient at the present time would be a "godsend" to the homœopaths. The scrapings of a single day, if sufficiently triturated, comminuted, and sugared over, would, according to the homœopathic theory, afford the means of banishing boils from the universe!

COFFINISM.

LEAVING the homœopathic mummeries to dilettante lords, whose names shine forth as Presidents of "SIMILIA SIMILIBUS INSTITUTIONS," we proceed to notice a system of quackery which is prevalent among another class of the community.

In September, 1849, we gave a brief outline of the doctrines promulgated by Dr. Coffin, the founder of what is called the "Medico-botanic system." These doctrines are further elucidated in a penny periodical, entitled "Coffin's Botanical Journal and Medical Reformer," published once a fortnight. Dr. Coffin's motto is

> "Human experience, which is constantly contradicting theory, is the great test of truth."—*Dr. Johnson.*

According to Dr. Coffin's theory, the absurdity of the study of anatomy as a branch of Medical Science is only equalled by the absurdity of the man who cut open a pair of bellows to see where the wind came from. All other branches of Medical Science are, according to the same theory, equally absurd, with the exception of a peculiar system of Medical Botany taught by Dr. Coffin. The *botanic practice* is extended to midwifery; and plentiful potations of infusion of raspberry leaves, with certain other nostrums of a similar character, are recommended in preference to the services of an accoucheur. The untutored Indian is held up as the model for imitation in medical skill. The athletic form and rude health of these savage tribes are taken by Dr. Coffin as a practical illustration of the value of wild herbs empirically administered; and hence he deduces the theory which he applies indiscriminately to mankind, whether in a state of nature or in an artificial state of civilization. He attributes all disease to a disturbance of the function of animal heat, and among the botanical remedies strong stimuli hold a prominent place. Cayenne pepper, cloves, and cinnamon are recommended in large doses, but fermented liquors are strictly prohibited. Lobelia inflata is "theoretically" described as having "no more poison in the plant than there is in pennyroyal," and it is practically administered in some cases in doses amounting to not less than two ounces in the course of the day!

Dr. Coffin has offered to test his theory by swallowing two ounces in the presence of witnesses. We have not heard whether the exploit has been performed; but we remember some years ago that M. Chabert (the fire-king) undertook to swallow an ounce of Scheele's prussic acid. A large assembly was attracted to the Argyll Rooms by the announcement, and when Mr. Wakley produced a bottle of the genuine article, and was about to pour out the dose as per agreement, the fire-king ran away and hid himself.

Referring to Dr. Johnson's motto, and applying the test of human experience to Dr. Coffin's theory, much assistance may be derived from the coroner's inquests, which continually bring the results of the medico-botanical treatment before the public.

The great obstacle to the elucidation of truth is prejudice. At some of the inquests which have occurred on the victims of Coffinism, the medical witnesses have apparently endeavoured to prove too much, alleging that they never prescribed lobelia inflata, *because* they considered it a dangerous drug. The same might equally be said against opium and many other valuable remedies. On the other hand the popular prejudice in favour of a theory which places the title of "M.D." within the reach of every mechanic, aided by the plausible eloquence of Mr. Sergeant Wilkins, could scarcely fail to exercise an undue influence over the minds of a jury unacquainted with the real bearings of the question at issue.

There is one feature in Dr. Coffin's theory which denotes considerable sagacity, namely, the prohibition of all alcoholic liquors. This injunction, together with the temporary use of vegetable stimuli, may be appropriate to the cases of those who have injured their constitutions by intemperance, and this must be admitted to be a set-off against some of the mischief perpetrated under the banner of Coffinism. But the most flagrant part of the botanic system consists in the extensive ramifications by which it is spreading its influence among a class of persons who, from the nature of their education, are quite unfit to be trusted with the administration of the powerful remedies placed in their hands. Dr. Coffin and his partner, Dr. Harle, give diplomas or certificates to persons desiring to embark in the medico-botanical practice. The following is their advertisement:

CERTIFICATES.

Those persons who may be desirous of practising the "Medico-botanic System," *as established by Dr. Coffin*, must present themselves for examination as to their knowledge of the system, and their fitness to prescribe, either at 24, Montague Place, Russell Square, London; or 50, Faulkner Street, Manchester; on Thursday evenings, from five to seven o'clock.

Notice is hereby further given, that it is our intention in future strictly to enforce the regulation in reference to giving assistance from the Defence Fund only to those who have provided themselves with certificates of their competency to practise our system. All those, therefore, who have been selling our remedies and practising our system without certificates, are requested, if they wish to have our sanction, to apply as above.

(Signed) A. I. COFFIN, M.D.

Societies are formed for the purpose of extending this kind of practice throughout the kingdom, and a branch society is about to be established in Ireland. The actors in this league are chiefly mechanics and good-natured labourers in factories, who, misled by the apparent simplicity of the science of medicine as promulgated by Dr. Coffin; and pleased with the idea of saving the lives of persons who they are taught to believe would otherwise be "poisoned by the doctors," enter the lists as Coffinites, and carry their bundles of herbs from house to house. One of these disciples was lately a shoemaker in the neighbourhood of Lincoln's Inn Fields, and now carries on an extensive trade in Coffinism, dealing out the herbs, pamphlets, and medico-botanical advice, where he formerly made shoes.

REVIVAL OF THE MEDICAL BREAD AND CHEESE SOCIETY.

Our numbers for April, May, and June, 1849, contain some account of the nature and proceedings of a Society called "The Medical Protection Society," the object of which we demonstrated to be *bread and cheese*, derivable, first, from the collection of the debts of its Members; secondly, from the "breaking up of the establishments of Chemists and Druggists."

The latter part of the project proved to be a total failure (See the case of the Apothecaries' Company *versus* Wells, vol. viii., p. 554); and in October, 1850, we reported the demise of the Society, the migration of the secretary, and the discovery of a vacuum in the cash-box. "Nature abhors a vacuum," and the Members testified their participation in this sentiment at a tumultuous meeting at which the demise took place. Subsequently a few of the respectable Members made another effort to revive and re-model the Society, an undertaking which has resulted in the formation of the "London and Provincial Medical Protection and Benevolent Society."

This institution, of which Mr. Propert is president, comprises the most respectable Members of the late Society, those who never sanctioned the disreputable prosecutions, and whose objects were confined to the legitimate protection of the character and interests of the profession. The aggressive proceedings of the former body were conducted chiefly by the Secretary, backed by a clique of malcontents, who used the Society as a cat's-paw for selfish purposes.

The mantle of the clique has descended upon a rival Society, established, we believe, about the middle of last year, by a renegade clerk from the other office, and denominated "The Medical and Surgical Protection Society." Its maiden exploit is reported in another part of this number (page 421).

The chief actor in the comedy (*sub rosâ*) was Mr. Popham, formerly, according to his own evidence, a patent medicine-vendor, now a surgeon and apothecary, who has a share in a Chemist's shop kept by his brother in the same street with Mr. Walker, the defendant.

Mr. Popham introduced the solicitors of the Medical and Surgical Protection Society to the sister of the plaintiff, furnished them with the particulars, and the names of the witnesses—that is to say, he "got up" the case. Mr. Popham was the chief medical witness, and described the dreadful effects of four grains of calomel taken in two doses. He was also the Chemist, and reported his analysis of the pills. His skill in manipulation must have been remarkable, as he isolated, by sublimation, the exact quantity of calomel which a pill and a half actually contained, and this, without being, to use his own words, "very exact as to the quantity." Yet he informed the jury that corrosive sublimate contained only *half a proportional of chlorine!* Coupling these two circumstances, we infer that his chemistry resides in his fingers, not in his head.

The other medical witness, by his own admission, is in practice as an apothecary, without a licence. He comes forward to condemn a Chemist for selling a box of pills without seeing the patient, while he admits, on cross-examination, that his own assistants are in the habit of prescribing under similar circumstances.

The most important feature in the case was the question raised by the Judge, "Whether it be legal for a Chemist to keep such pills ready prepared and to supply the same, he not being an apothecary?" The raising of this question implies a misconception of the Apothecaries Act of 1815, which reserves to Chemists and Druggists the right of "buying, preparing, compounding, dispensing, and vending drugs and medicinal compounds wholesale and retail," and "using or exercising the said trade or business in such manner as fully and amply to all intents and purposes as the same trade or business was used, exercised, or carried on by Chemists and Druggists before the passing of this Act."

In accordance with this proviso, all Chemists prepare and vend, as they formerly did, pills for domestic use, among which an aperient pill containing a grain of calomel is in frequent demand. A patient who sends to a Chemist for a threepenny box of aperient pills, knows very well that he does not receive medical advice into the bargain. He takes upon himself the responsibility of keeping the fee in his pocket, and purchasing a common domestic remedy, whether it be a purge, a stomachic, or a tonic.

Mr. Popham, for an obvious reason, did not admit that he was, when a Chemist, in the habit of preparing and selling medicines in this manner; and, by his evasion of the question, he fell into the dilemma of representing himself as having been merely a patent medicine-vendor, and consequently *not responsible.*

With regard to the Medical and Surgical Protection Society, a question naturally suggests itself, why do they not attack the Coffinite shoemaker, who resides within a few yards of their office in Lincoln's Inn Fields, instead of seeking a victim in Somers Town?—*Answer:* Because there is not a rival Apothecary in the same street who is interested in "getting up" a case.

TRANSACTIONS
OF
PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,
Wednesday, January 8, 1851.

MR. WAUGH, VICE-PRESIDENT, IN THE CHAIR.

DONATIONS TO THE LIBRARY AND MUSEUM.

The following donations were announced :—

Quarterly Journal of the Chemical Society, from the Society.

Lehrbuch der Arzneimittellehre, by Dr. C. G. Mitscherlich, of Berlin, from the author.

Fruit of *Acacia farnesiana*, from Mr. William Mansell, South Street, Greenwich.

NOTICE OF ACACIA FARNESIANA.

The *Acacia farnesiana* is described by Guibourt as a small tree, rarely attaining a height of six yards. It is very common in the Mauritius, where it is called *Cassia*. The fruit has been called *Balibabula* or *Cassia grains*. It has been cultivated in Italy and in Provence on account of its flowers, which have a very agreeable, rather musky, odour, for which they are used in perfumery under the name of *Cassia flowers*. The fruit contains astringent matter, for which it is used in tanning, and also as a dyeing material.

Lindley states that the flowers yield, by distillation, a delicious perfume, to which also potent virtues are ascribed.

ON ARNICINA,
A NEW ORGANIC BASE FROM ARNICA MONTANA,
With some Remarks on the General Methods of Isolating Alkaloids.

BY MR. WILLIAM BASTICK.

THERE is perhaps no inquiry more interesting and important to the Physician and the Pharmaceutist than that which has for its object the discovery of organic bases, especially when directed to those substances of the Materia Medica which stand in high and deserved repute.

The reason of this importance and interest is manifest, when we consider how extensively the salts of quinine have displaced the use of bark, and the salts of morphia that of opium, and that it may be laid down as a law in Pharmaceutical Chemistry, that when a plant contains an organic base, then that organic base is the active principle of the plant.

The time is probably not long distant when the salts of conia, hyoscyamia, and atropine, will be found in the Pharmacopœia, to the exclusion of those necessarily uncertain preparations, tinctures and extracts of conium, hyoscyamus, and belladonna, as recommended by Liebig, and other distinguished authorities.

The number of vegetable bodies containing alkaloids is, I believe, much more extensive than is generally expected, judging from the investigations already published, and the light which analogy sheds on the chemical constitution of plants.

The importance of the discovery of morphia by Sertürner in 1804, is scarcely possible to be over estimated, for he was the pioneer who led the way in a department of Pharmaceutical research which has enriched the Materia Medica with that valuable class of bodies the alkaloids, and promises still more numerous, if not more remarkable, acquisitions to it.

No sooner had Sertürner announced the method by which he had succeeded in eliminating morphia from opium, than the continental Pharmaceutists, with a worthy rivalry, commenced investigations in every direction, hoping thereby to obtain similar results from other bodies, whose activity on the animal economy had been clearly ascertained. After a time, richly rewarded were their foresight and zeal, for Gomes discovered cinchonine in 1811. Pelletier and Caventou isolated emetine in 1817, and quinine in 1820. Meissner obtained veratrine in 1818, and Pelletier and Caventou discovered strychnine in the same year. Several other organic bases were discovered by these and other Pharmaceutists about and during the same period.

After this time the progress of the discovery of the alkaloids comparatively ceased, for the simple reason that the methods by which the above bases were eliminated failed when applied to the extraction of similar bodies from such plants as conium, tobacco, hyoscyamus, &c. Pharmaceutists then properly turned their attention to devising new methods for the separation of organic bases, reasoning correctly that the plants from which they failed to obtain them might nevertheless contain them; but that the alkaloids sought for might possess such different properties from those already known as to render their elimination by the usual methods impossible.

They succeeded in devising new methods, and these new methods were eminently prolific in important results, for we are indebted to them for a number of alkaloids possessing such active powers on the animal economy as to be unsurpassed by any substances before known, either of organic or inorganic origin.

It is customary with the authors of works on systematic Chemistry to divide the alkaloids into two classes, the non-volatile and the volatile; and, in pursuance of this arrangement, to give two general methods for extracting them. The first consists in treating the substance containing an organic base with a dilute mineral acid for the purpose of dissolving it thereout; the base is then precipitated from this solution by a caustic alkali. This process is suitable when the base is not decomposable by alkalies or not very soluble in water, and is best adapted for those which are non-volatile. The second method directs the substance to be distilled with a weak solution of a caustic alkali, and is available when the base is volatile and not readily decomposible by caustic alkalies.

In confining themselves to this limited classification these writers have left unprovided for a great number of alkaloids, which admit, and are perhaps not unworthy, of forming a class, and consequently a method indicated by which they may be in general recognized and eliminated.

The alkaloids alluded to are those which are destroyed by the action of caustic alkalies, and are, consequently, not to be obtained by either of the above methods; as for example—hyoscyamia, daturina, atropina, aconitina, and lobelina. Some of these are volatile and others non-volatile, and they also vary considerably with respect to the degree of their solubility in water. But they all agree in one important point, viz. that they can be extracted from their sources by the process which I have previously described for obtaining lobelina.*

My object in endeavouring, however imperfectly, to give a concise account of the discovery of organic bases, and the methods for their extraction, is to invite the attention of British Pharmaceutists to an extensive and important field of inquiry, and to the precautionary measures required, in searching for alkaloids amongst the numerous potent members of the vegetable kingdom, although not altogether to discard the old methods for their detection; yet when they fail to prosecute their researches by the more recent ones, and even when both are ineffective to devise methods for themselves. It may be mentioned to show the facility of the process to which I have endeavoured to call attention, as well as the no doubt extensive results which may be secured by it, that, in addition to the isolation of lobelina, I have obtained strong indications by it of organic bases in Spigelia anthelmintica, Aristolochia serpentaria, besides the organic base arnicina, from Arnica montana, which the chief object of the present paper is to describe.

Arnica montana, although not extensively used in this country, is held in high estimation by the medical profession in Germany as an effective remedial agent. It is known to exercise a powerful and defined action on the animal economy. The flowers, and other parts of this plant, have several times been chemically examined, and their virtues have been generally ascribed to an acrid resin which they contain. But there has been much doubt expressed as to whether this resin was really the active principle, for Professor Pfaff, of Kiel, observes, " Arnica flowers is one of those agents whose chemical composition, and therapeutic powers which depend on the former, are enveloped in obscurity."

Dr. A. T. Thomson has recorded his belief that he had detected igasurate of strychnine in the flowers. This statement induced Versmann,† at the suggestion of Pfaff, to institute an inquiry by direct experiment as to its correctness. The result was that he has proved the absence of any compound of strychnine in them. My experiments bear testimony to the truth of his conclusion in this matter, while I differ entirely from him in another one, that in which he denies the existence of any alkaloid in this plant. But it is not altogether surprising that he should have overlooked the presence of an organic base in it, for he proceeded in his research upon the assumption that if arnica contained an alkaloid it would be precipitated from its solution by ammonia. This failure of Versmann to eliminate the organic base of arnica is an evidence as to the necessity of, as I have previously remarked, Pharmaceutists using the improved methods in their investigations.

The flowers of the Arnica montana being that part of the plant in which its medical qualities are said to be most predominant, were selected for examination.

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* See Pharmaceutical Journal, vol. x., p. 271.

† Ibid., vol. iv., p. 288.

They were subjected precisely to a similar process to that by which lobelina was extracted from lobelia inflata, the result of which was the elimination of an organic base, arnicina. This substance has a strong alkaline reaction. It combines with acids, forming a series of salts. When exposed to a high temperature it suffers decomposition, and leaves a carbonaceous residuum, consequently it is not volatile. I have not yet been able to ascertain whether it is crystallizable, in consequence of the smallness of the product which the flowers yielded, but, as far as can be judged from its condition when obtained by evaporation from the ethereal solution, it has a disposition to assume that form. To the taste it is slightly bitter, but not acrid, and has the odour of castor. From the aqueous solutions of its salts it is precipitated by tincture of galls in somewhat dense flocks. It is slightly soluble in water, but much more so in alcohol and ether. When subjected to the action of caustic alkalies it is decomposed.

The hydrochlorate of arnicina, after being freed from its colouring matter by animal charcoal, forms stellated acicular transparent crystals.

What are its peculiar therapeutic properties is a question that must remain for the skill of the physiologist to determine. This base, doubtless, deserves a more complete examination than it has received, but this task can only be accomplished by operating on a large quantity of the flowers, as independently of the small per centage of arnicina which the flowers primarily contain, much of it is unavoidably lost in each step of the process for its eduction.

In conclusion, whilst again presuming to impress on the attention of Pharmaceutists the necessary advantage of a thorough re-examination of those vegetable substances of remarkable character which have been pronounced to be destitute of alkaloids, as well as those which have received no examination at all worthy of being so called, let me observe in the words of Kopp, the author of a valuable memoir on the artificial formation of alkaloids, that " such a work would be within the domain of the Pharmaceutist who, being perfectly familiar with the ordinary modes of their extraction, could, without any great difficulty, isolate pure, and frequently crystallizable principles; if their elementary analysis and their exact description were beyond the ordinary means at his disposal, any Chemist would willingly carry on the examination of the substance thus isolated, and in this manner contribute his share to the advancement of his own science."*

The CHAIRMAN congratulated Mr. Bastick on the successful results of the investigations he had communicated to the Society in this and in previous papers. There could be no doubt that the vegetable Materia Medica presents a wide field for chemical research, from which much information, valuable to the medical profession, might be derived.

Mr. BUSHELL inquired whether the arnica flowers operated upon by Mr. Bastick were such as are commonly met with in commerce. He had several times endeavoured to raise the plant at the gardens of the Royal Botanic Society from the seeds found in the flowers of commerce, but had always failed, and he was anxious to meet with a specimen in a more recent state. He believed the flowers which came from Germany were smoke-dried, and this may probably account for his having failed to grow them.

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* Works of the Cavendish Society, vol. i, p. 298.

Mr. **Dickinson** would also be glad to know whether Mr. Bastick had operated upon the root as well as the flowers. Both parts of the plant were used in medicine, and the tincture made from one differed considerably from that made from the other. He believed the homœopaths preferred the flowers, but it would be desirable to ascertain in which part the active principle existed in greatest abundance.

Mr. **Bastick** said he had operated only on the flowers as met with in commerce. He believed the root contained more resin, and less of the peculiar principle which he had described.

Mr. **Daniel Hanbury** thought the flowers would be likely to be more uniform in their properties than the root, as they would always necessarily be collected at the same season and period of the growth of the plant, while the root might be collected at different periods, when its properties would be very dissimilar.

THE NEW DUBLIN PHARMACOPŒIA.

The adjourned discussion on this subject was renewed by Mr. Redwood, who offered some remarks on the formulæ for the preparation of acids. He thought it very desirable that the instructions contained in a Pharmacopœia should not entail on those, for whose guidance the work was intended, any unnecessary trouble or expense in the preparation of the medicines; and that the primary object should be clearly to define the substances which were intended to be used, rather than to indicate the particular manner in which they were to be produced. He would endeavour to show how far the formulæ for acids in the new Dublin Pharmacopœia had been framed in accordance with these views.

The first of the acids ordered is,

GLACIAL ACETIC ACID.

Acidum Aceticum Glaciale.—This is directed to be made by first drying acetate of lead at a temperature about 300°, until it ceases to lose weight, then powdering it, and exposing it to an atmosphere of dry muriatic acid gas, until it exhibits a dampened appearance; and, lastly, submitting it to distillation until the entire of the acetic acid shall have distilled over.

The only character described is its specific gravity, which is to be 1065.

Now here the instructions given are not sufficient to ensure the production of pure glacial acetic acid. If the process be strictly followed, the product will at least be contaminated with hydrochloric acid; and in addition to this, there will be a disagreeable flavour derived from the lead salt; for this is always the case when acetate of lead is used, unless the acid be re-distilled. There are no instructions given for purifying the acid obtained by the first distillation, and the only character assigned, namely, specific gravity, is worthless in this case. If it was thought desirable to make glacial acetic acid an article of the Materia Medica, would it not have been much better to have clearly defined its chemical characters, properties, and composition, and to have left the manufacturer to make it in any way he thought proper? The College has omitted the most valuable part of the instructions that might have been given, and has inserted just so much as would justify the use of an acid different from that which was probably intended to be ordered.

But is glacial acetic acid required as a medicinal agent? The only purpose for which the College of Physicians, who order it, direct it to be used, is for making a weaker acid (*Acidum aceticum forte*), by diluting it with water. Now, the practical difficulties attending the preparation of glacial acetic acid render its price much greater than that of an equivalent quantity of a weaker acid; and this mode of preparing the *Acidum aceticum forte* is therefore unnecessarily expensive. Even of this latter acid no other means of identification are given than its specific gravity; and that this is a very imperfect criterion may be inferred from the fact, that while the specific gravity of the glacial acid is 1065, that of the acid diluted with two-thirds its volume of water, is 1066.

Besides these forms of acetic acid, commercial acetic acid is also ordered, but of weaker strength than the above. Of this again the specific gravity is the only character given by which to determine its strength or purity.

Practically the acetic acid used in medicine will always be commercial acid, for no Dispensing Chemist or Apothecary is likely to attempt the manufacture of such an article, and a formula for its preparation was therefore unnecessary.

GALLIC ACID.

Acidum Gallicum.—There are two processes described for the preparation of gallic acid. These are the processes generally given in chemical books. The first process is that which consists in exposing moistened galls to the air, until the tannic acid has become oxidized, and gallic acid formed as one of the products. In the other process the galls are treated with sulphuric acid.

If either of these processes had presented a method by which an inexperienced manufacturer could readily obtain the required product in a state of purity, the other might have been omitted; but if by neither process could the acid be advantageously made, excepting on the large scale, as really is the case, it would, perhaps, have been wiser to omit the processes altogether.

HYDROCYANIC ACID.

Acidum Hydrocyanicum dilutum.—The process for the preparation of this acid is the same, excepting the proportions of the ingredients, as that given in the London and also in the Edinburgh Pharmacopœia. The instructions given, however, are insufficient to ensure uniformity in the results of different operations, and the only criterion given, by which to judge of the strength and purity of the product, is its specific gravity, which is quite inadequate for the purpose.

NITRIC ACID.

Acidum Nitricum purum.—The acid ordered under this name is the strong acid, of specific gravity 1.500, which is nearly the strongest nitric acid that can be made, and stronger than can be kept without its undergoing decomposition. The name *Acidum Nitricum purum* is a misnomer, for however pure the acid may be when first prepared, it soon becomes contaminated with nitrous acid. A weaker acid would keep better, and would answer every purpose required in Pharmacy.

A formula is given for nitro-muriatic acid (*Acidum nitro-muriaticum*), which is still more prone to change than the strong nitric acid, and ought only to be made when used.

SULPHURIC ACID.

Acidum Sulphuricum purum.—This is the last of the acids to which I shall refer. Oil of vitriol of commerce is directed to be distilled from a small plain retort into a Florence flask. The distilled product is to be transferred to, and preserved in, a well-stopped bottle. Its specific gravity is to be 1.846.

Diluted sulphuric acid, and other preparations, are ordered to be made with this acid.

There could scarcely be a stronger case adduced than this for the application of the remarks with which I commenced. The Pharmaceutist is called upon to perform a difficult and dangerous operation, for which there is no necessity, and which, if performed, would not completely fulfil the object contemplated. It would have been well had the most commonly occurring impurities in commercial oil of vitriol been pointed out, and the characters of the pure acid described; but to expect that the oil of vitriol used in medicine shall be submitted to distillation, as directed, is unreasonable, nor would the application of such a process ensure its purity.

The instructions of the College in this respect will not, practically, be obeyed, and the effect of this is, that men reconcile their minds to the violation of such orders, and becoming accustomed to the non-observance of instructions which ought to be imperative, they are ultimately induced to disregard the Pharmacopœia in cases where there is no justification for such conduct.

Mr. GRIFFIN observed that he had made some experiments on glacial acetic acid, and had come to the conclusion that it was very difficult to get the monohydrated acid, the crystalline acid being generally found to contain more than one atom of water. The acid made according to the instructions of the Dublin Pharmacopœia would be impure. He thought there was a manifest disadvantage in using very strong acids as the standards, for they are generally more impure than when in a less concentrated state.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, January 17, 1851.

FIRST CONVERSAZIONE.

ROBERT CLAY, Esq., President, took the chair at six o'clock, and gave a short sketch of the proceedings and objects of the Society, expressed the pleasure he felt at so large and influential an audience, and concluded by expressing the obligations the Society was under to those gentlemen who had favoured them with communications from time to time, and especially for the assistance afforded on the present occasion; he also acknowledged the liberality of the Committee of the Royal Institution in throwing open to them for that evening the whole of the splendid Museum, and in allowing them the use of their costly apparatus; he begged to introduce Dr. Thomson, who would address them in the Geological Gallery. The company repaired upstairs, where

Dr. Thomson exhibited a series of fossil remains both animal and vegetable, and gave graphic and interesting sketches of their history, habitat, and era, in the Mammal Museum.

Dr. **Nevins** addressed the company on the distinctions in the anatomical structure of the carnivora and herbivora, which he illustrated most ably by diagrams, skeletons, and stuffed specimens, and interspersed with lively anecdote, bearing on his subject.

Mr. T. C. Archer gave an account of certain plants yielding valuable medicines, in the room containing the Materia Medica collection, with a notice of their peculiarity of growth and structure, illustrated by a series of beautifully executed diagrams. At the same time, in another room, Dr. **Dickinson** explained the method of preparing and arranging a Hortus Siccus, noticing particularly those natural families most favourable for this mode of preservation, and exhibiting some beautifully prepared specimens of ferns and mosses from his own extensive herbarium.

An interval was then occupied by promenade through the museums, refreshments, an observation of microscopic objects under some splendid instruments lent and exhibited by Dr. Inman, Dr. Higgins, and Mr. H. S. Evans, who also showed an excellent polariscope. A number of gutta-percha novelties were also lent by Messrs. Johnson for the occasion; and a few very rare minerals and metals by Mr. Marrat, including a splendid crystal of selenium. A band of music further enlivened the interval at eight o'clock.

Mr. **Hamilton** (Professor of Pharmacy in the Society's laboratory) delivered a most brilliant and effective lecture on the "Chemistry of the Gases." The experiments were on a large scale, and very numerous, and conducted with remarkable neatness and rapidity of manipulation; and at the close, the enthusiastic applause expressed the high appreciation the audience entertained of the success of the lecturer.

A second interval was devoted to microscopic observation, music, and refreshment, and at ten o'clock

Dr. **Brett** (Professor of Analytical Chemistry in the Society's laboratory), although labouring under a severe cold, delivered an able lecture on "Voltaic Electricity, particularly in its Relations to Magnetism and Frictional Electricity," and the experiments illustrated the identity of these forces. A very large electro-magnet was charged, and sustained some cwts. The deflagration of metals was shown with great brilliance, and, at the conclusion, 150 cells of Wollaston's being charged and connected with good charcoal points, a brilliant arc of light of about a quarter of an inch in length was obtained. Mr. **Sweetman** by its aid obtained a daguerreotype copy of a bust of Sir Robert Kane, recently taken by Cahill. Unfortunately, however, the specimen was subsequently injured by the acid fumes arising from the previous experiments. This concluded the evening's proceedings, which appeared to give universal satisfaction. The attendance was nearly 400, including a fair proportion of ladies.

ORIGINAL AND EXTRACTED ARTICLES.

USE OF LITMUS IN HOLLAND.

In the Pharmaceutical Journal for January, 1851, p. 326, Dr. Pereira stated, that from the number of qualities of litmus kept by Dutch manufacturers, he inferred "that litmus is used in Holland for other purposes than that for which it is employed in England." In a letter which he has subsequently received from Dr. de Vry, of Rotterdam, this inference is shown to be correct; for Dr. de Vry states, that in Holland cake litmus is employed in tapestry manufactures; and also to mix with the lime with which the walls of the rooms in farm-houses are whitened. In the latter case the litmus is used to take away the yellowish colour.

Formerly, the number of litmus manufacturers in Holland was much greater than now, there not being more than three or four at present.

The difference in the price of the different sorts of litmus does not depend on the *quantity* of colouring matter which they respectively contain, but on its *quality*. A *pure blue* coloured cake litmus is much higher in price than that which has a reddish tint.

COFFEE AND ITS ADULTERATIONS.

The *Lancet* has commenced the publication of a series of interesting and useful essays on the microscopical and chemical analysis of the various articles of diet supplied to the inhabitants of this great metropolis. The first article examined is that of coffee; and from the essay on this substance we proceed to make a few extracts.

Structure of the Coffee Berry.—In the coffee-berry two parts are to be discriminated, the substance of the berry and the testa or investment by which it is surrounded.

The substance of the berry consists of an assemblage of vesicles or cells of an *angular* form, which adhere so firmly together that they break up into pieces rather than separate into distinct and perfect cells. The cavities of the cells include, in the form of little drops, a considerable quantity of essential oil, on the presence of which the fragrance and many of the active principles of the berry mainly depend.

The testa or membrane presents a structure very distinct from that of the substance of the berry itself, and when once seen it cannot be confounded with any other tissue which has yet been observed entering into the adulteration of coffee: it is made up of elongated and adherent cells, forming a single layer, and having oblique markings upon their surfaces. Between the berry and its covering a large quantity of essential oil is generally present.

The quantity of this membrane present in a broken and divided state in any sample affords, therefore, some clue to the quantity of coffee contained in it.

It has been proposed to deprive the berry of this membrane, and a patent has actually, we are informed, been taken out for this purpose—a process which we consider to be not merely unnecessary, but positively injurious, because the removal of this tissue cannot be effected without the loss of the greater part of the essential oil lying between it and the berry, and usually adherent to the former.

In the groove which runs along each berry, a few small vessels, formed of a single and continuous spiral thread, are usually to be met with; it is impossible, however, to confound these with the ducts hereafter to be described.

Now, the roasting of the berry does not alter its structure; the tissues are indeed partially charred, but they still preserve their chief characteristics. The essential oil, however, is no longer visible in the cells in the form of minute drops or spherules. This has, in part, probably been dissipated by the heat employed in the process of roasting, and in part is more generally diffused throughout the cavities of the cells; that it is not entirely dissipated and destroyed is evident from the fact, that in ground roasted coffee, diffused in a little water, the oil may be readily detected in considerable quantity in a partially fused state, and therefore in little masses, irregular in size and form.

Adulteration of Coffee.—Thirty-four samples of coffee, purchased at the establishments of different metropolitan grocers, tea and coffee merchants were subjected to examination. The results were as follows:

1st. That the thirty-four coffees, with three exceptions, were adulterated.
2d. That chicory was present in thirty-one instances.
3d. Roasted corn in twelve.
4th. Beans and potato-flour, each in one case.
5th. That in sixteen cases the adulteration consisted of chicory only.
6th. That in the remaining fifteen samples, the adulteration consisted of chicory, and either roasted corn, beans, or potatoes.
7th. That in many instances the quantity of coffee present was very small; and in others, not less than one-fifth, fourth, third, half, and so on, of the whole article.

Adulterations, how distinguished.—The several adulterations noticed may be distinguished by the following characters:

The adulteration by *chicory*, by the size, form, and ready separation of the component cells of the root, as well as by the presence of an abundance of spiral vessels of the dotted form.

That by *roasted corn*, by the size, form, and other characters of the starch granules, of which the grains are principally composed.

That by *beans*, also by the form, &c. of the constituent granules of starch.

That by *potato*, by the large size and ready separation of the cells of the cellulose, as well as by the fibrous markings on their surfaces.

Lastly, the adulteration with *burnt sugar*, by the tests proper for grape-sugar.

By attention to the above particulars, the principal adulterations to which coffee is liable may be detected with facility and certainty. Other means, however, for the discovery of certain of them, have been pointed out, and which we shall now consider.

Thus, it has been stated, that if coffee containing chicory be shaken up with cold water in a wineglass, it will float, while the chicory will sink to the bottom, and this, on a repetition of the trial, we have found to be correct to a very great extent, but not entirely so; in many cases part of the coffee subsides with the chicory, and a portion of this rises to the surface with the coffee, and after the lapse of a few minutes, in general both coffee and chicory fall to the bottom, so that in this way we are not able to separate the two substances completely the one from the other, and therefore are unable to determine exactly the quantity of each ingredient of which any sample professing to be coffee is made up, although we can estimate very nearly the proportion of each actually present. It is best not to shake the suspected coffee up with the water, but to place it gently upon the surface; it is also advisable to experiment with powdered chicory and coffee separately in the first instance. The reason why the coffee floats upon the liquid is to be found in the quantity of essential oil which the berries contain, which makes them lighter than the water, which they at the same time repel; on the other hand, it is the absence of this oil which occasions the sinking of the chicory root. In repeating these experiments, it will be observed that the water to which coffee alone has been added, becomes scarcely coloured for some time, while that with the chicory, in less than a minute assumes a deep brown tint.

It is of importance to know, however, that this test is almost equally applicable to roasted corn as to chicory.

It has been further stated, that the presence of roasted corn may be detected by the blue colour produced on the addition of a solution of iodine to the cold decoction. We have not found this to be the case exactly, for on adding iodine to decoctions of five different coffees ascertained to be adulterated with roasted corn, the liquids did not become blue, but almost black, with a tinge of brown or olive. This appears to arise from the obscuration of the blue developed by the iodine, by the rich colouring matter of the chicory—a proportion of which almost always accompanies the adulteration with corn. This test, however, is still very useful, although it does not give rise to a colour which can be called blue. It should be known, also, that solution of iodine, added to a cold decoction of chicory root, deepens the colour very greatly, we presume owing to the presence of a small quantity of starch; the increase of colour is never, however, so considerable as when flour is present.

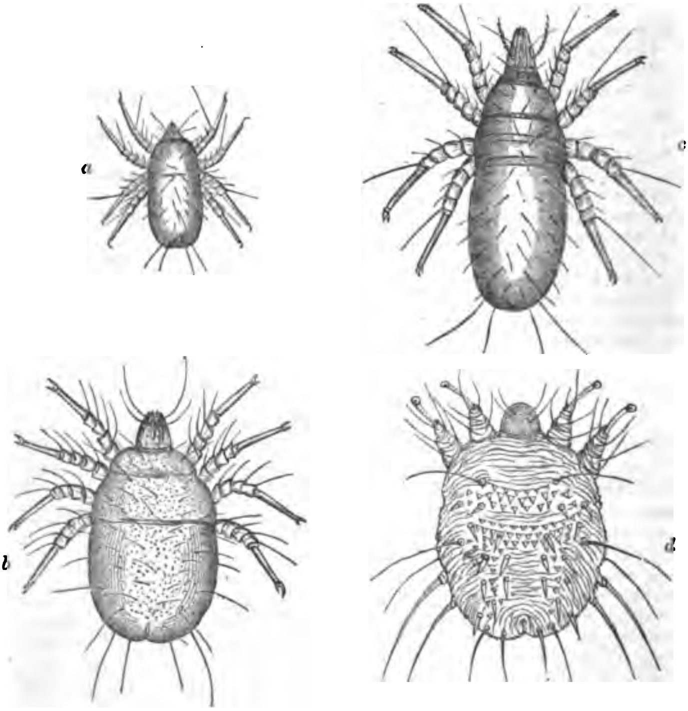
It is to be observed that no exact idea can be formed in this way of the quantity of starch contained in the adulterated coffee, because the greater part of it is charred, and, therefore, gives no reaction with iodine.

With these explanations the above tests will be found very useful to those who have not a microscope at command.

In searching for roasted corn in coffee with the microscope, the fragments, before being submitted to the object glass, should be well broken up with the points of needles.

THE SUGAR MITE.

In our last number (*Pharmaceutical Journal* for January, 1851, p. 343) we announced the existence of mites, both living and dead, in brown sugar. We subjoin a figure of the sugar mite, as well as of several other mites, for comparison, all drawn to the same scale.



Acari or Mites.

a. The sugar-mite.
b. The cheese-mite.
c. The meal-mite.
d. The itch-mite (*Acarus Scabiei*).

These figures have been drawn from nature by Mr. Aldous, Microscope Artist to the Royal College of Surgeons. Mr. Jackson, Surgeon, of Church Street, Spitalfields, has kindly measured these animals, and found their length to be as follows:

	Parts of an English Inch.
Sugar-mite	0.08
Cheese-mite	0.12 0.16
Meal-mite	0.16 0.18 by 0.08 wide
Itch-mite	0.14

We suggested in our last number that grocers' itch might possibly be produced by the sugar-mite. It has been suggested by a writer in the *Lancet* for January 18th, 1851, that, perhaps baker's itch may be produced by the meal-mite. The same writer states that he submitted thirty-six brown sugars to examination, and found:

1st. That fragments of cane, frequently so minute as to be visible only with the microscope, were detected in all the sugars except one, that being a very white sugar, and evidently purified by filtration, so as to cause it to approach in character refined or lump sugar.

2nd. That the *disgusting-looking acari were present in thirty-five out of the thirty-six sugars*, and in nineteen cases in very considerable numbers.

3d. That sporules and filaments of fungi were present in at least ten cases.

(From subsequent examinations we have ascertained that sporules of fungi are almost invariably present in brown sugars.)

4th. That grape-sugar was detected in the whole thirty-six sugars, often in very considerable amount.

5th. That the whole of the sugars contained a variable proportion of vegetable albumen.

6th. That a greater or less number of pieces of woody fibre were noticed in nearly all the sugars.

7th. That stony particles or grit were observed in at least eleven instances.

8th. That a variable quantity of starch or flour was contained in each sample of sugar submitted to examination, either in the form of free granules, or aggregations of granules and cells.

9th. That in four of the sugars the amount of flour was so considerable, that it had evidently been employed for the purpose of adulteration.

ON THE MANUFACTURE OF CREAM OF TARTAR, TARTARIC ACID, PARATARTARIC ACID, CARBONATE OF SODA, SULPHATE OF POTASH, ROCHELLE SALT, AND CITRIC ACID.

Manufacture of Cream of Tartar.—One of the constituents of the juice of the grape is the bitartrate of potash, which, in the form of what is called in commerce *tartar* and *argol*, is deposited in the wine casks on the commencement of fermentation, and this salt being but slightly soluble in dilute alcohol, the quantity deposited increases in proportion as the fermentation, and consequent increase of spirit in the liquid, progresses. Another portion of the tartar or argol is obtained from the marc or mass of grape stalks and husks remaining after the juice has been pressed out; and a further portion is found in the froth or scum which rises to the surface of the fermented liquors. From one or all of these sources combined, the cream of tartar of commerce is obtained. For this purpose the tartar deposit or scum is placed in a copper full of water, and boiled for an hour or so, to dissolve out the bitartrate of potash. This solution is then filtered off into large coolers, where coloured crystals of tartar are obtained, free from many of the impurities previously contained in it. These coloured crystals of tartar are then returned to the copper, and dissolved by boiling in water; a quantity of animal charcoal is next added for the purpose of decolorizing the solution, and shortly afterwards some white clay for the purpose of finishing the discoloration and removing the animal charcoal employed. The colourless solution is filtered off into crystallizing vessels as before, and thus colourless crystals of cream of tartar are obtained. If the crystals be not sufficiently white, the second part of the process may be repeated. As however it often happens that these tartar deposits contain a good deal of tartrate of lime, the manufacturers at Montpelier have of late introduced some improvements in the making of cream of tartar, with the view of transforming this tartrate of lime, which would otherwise be lost, into bitartrate of potash. To effect this, the matters containing tartrate of lime are boiled with sulphate of potash and an excess of sulphuric acid, by which means sulphate of lime and bitartrate of potash are obtained. Another improvement lately adopted consists in converting the neutral tartrate of potash, which is found in the mother-liquors resulting from the first operation in the manufacture of cream of tartar, into bitartrate, especially when the matters operated on have undergone a commencement of fermentation. As, instead of water, these mother-liquors are employed in the solution of fresh portions of the raw materials, they at length become charged with neutral tartrate of potash. To convert this neutral tartrate into bitartrate of potash, sulphuric acid is added until no further precipitation of bitartrate takes place: the mother-liquor contains, together with some bitartrate in solution, sulphate of potash, which serves in the before-mentioned process for converting tartrate of lime into bitartrate of potash.

Manufacture of Tartaric Acid.—The process indicated by the London Pharmacopœia is not now adopted on the large scale; the following is the process commercially employed. A large wooden vat or generator, as it is termed, closed at the top, and furnished with a man-hole secured by a water joint, is the apparatus or vessel used for the decomposition of the tartar and liberation of the tartaric acid. This generator is provided with an exit-pipe for the escape of carbonic acid gas, liberated during the process, and an agitator or stirrer, consisting of a stout iron rod having attached to its lower extremity a long arm of wood to stir the contents of the generator, the upper extremity of the rod being connected by means of appropriate machinery with some motive power, as that of a steam-engine. This generator is usually of a capacity of about 2000 gallons, and is larger at its base than at its summit. A pipe in connection with a steam-boiler enters at the side of the generator, and another pipe connected with a reservoir of cold water enters the upper part of the generator, which is also provided with cocks at suitable levels for the purpose of drawing off the contents. Into this generator, about one-fourth filled with water, 1500 pounds more or less (according to the quality of the tartar employed) of whiting or washed chalk (carbonate of lime) are introduced, steam is then allowed to blow in from the boiler so as to heat the water, and the agitator is set in motion until the lumps of the whiting are broken and a mass of uniform consistence obtained; this done, about two tons of tartar of average quality are introduced by degrees, and the agitator again set in motion; the result is, that the free tartaric acid contained in the bitartrate of potash unites with the base of the whiting, forming insoluble tartrate of lime, which precipitates to the bottom of the generator, leaving the neutral tartrate of potash in solution, the carbonic acid having escaped through the exit-pipe in the gaseous form.

Having thus removed one equivalent of tartaric acid from its combination with potash, the next part of the process is to remove the other; and this is effected by the addition of sulphate of lime in the state of paste to the solution of tartrate of potash; heat and agitation are again applied, the tartrate of potash is decomposed, the second equivalent of tartaric acid enters into combination with the base of the sulphate of lime, and tartrate of lime precipitates to the bottom to join that formed in the previous operation, whilst the potash united with sulphuric acid remains in solution as sulphate of potash. The solution of sulphate of potash thus formed, is drawn off when clear into suitable reservoirs to be treated, as hereinafter described. The tartrate of lime is next well washed with two or more successive charges of cold water; these washings contain more or less of sulphate of potash, and are run off into suitable reservoirs. To the remaining tartrate of lime a sufficient quantity of water is then added, together with the requisite quantity of sulphuric acid, to effect its decomposition; sulphate of lime is precipitated, and tartaric acid remains in solution. The whole contents of the generator are now run off into a wooden back lined with lead, some fifteen or sixteen feet in length, six in width, and two in depth, furnished with a perforated false bottom, and lined throughout with stout twilled flannel. This back serves as a filter, and the filtered solution of tartaric acid passes off through a pipe, connected with the bottom of the back, into suitable reservoirs. When the acid solution has passed through the filter, water is carefully added to the sulphate of lime remaining, in such a way as to ensure its uniform percolation through the mass, and not run off through partial channels or fissures formed in the sulphate, which would prevent the entire removal of the acid. As soon as the residuary sulphate of lime is quite tasteless, and the filtered liquor free from tartaric acid, the pasty mass of sulphate of lime is removed by means of wooden shovels, and as much of it as may be required is again used in the decomposition of the neutral tartrate of potash solution of the succeeding operation; whilst that portion of it which is not required for that purpose, may be dried over the coke ovens hereinafter mentioned, and sold as manure. The expense of chloride of calcium, formerly employed to effect the decomposition of the tartrate of potash, is thus saved, and the decomposition quite as effectually accomplished. The filtered solution of tartaric acid is next concentrated by evaporation, and crystallized; for this purpose it is placed in wooden vessels lined with lead, of various lengths and widths, and about nine inches deep, along which coils of lead pipe are made to traverse; steam is then passed through these pipes, and the concentration of the acid is thus effected. Deposits of sulphate of lime, held in solution by the acid, take place around the lead pipes during the process of concentration. As the solution of tartaric acid is readily decomposed, care should be taken that the temperature does not much exceed 165° Fahr. There can be no doubt that the adoption of the vacuum-pan would prove highly advantageous in the concentration of tartaric acid solutions. The plan of pumping cold air into the tartaric acid solution whilst undergoing concentration, has been tried on a large scale, but experience having proved that a loss of acid resulted, the process has been abandoned.

When the liquor has attained the specific gravity of about 1500° it is drawn off into suitable crystallizing vessels; these are formed of sheet-lead, are cylindrical in shape, usually about four feet in height, and two feet in diameter, and each capable of holding about five cwt. of tartaric acid in solution; these crystallizers are placed in a warm situation, and in the course of three or four days there is produced in each a crop of crystals averaging about two cwt. These crystals however contain a portion of colouring matter, which is removed by placing them in a vessel lined with lead, with water and animal charcoal (previously well washed with dilute hydrochloric acid to remove the calcareous salts contained in it), steam is blown in, the acid is dissolved, and the saturated solution digested with the animal charcoal, filtered, again concentrated, and crystallized. The crystals are next washed, drained, and lastly, dried on wooden trays lined with thin sheet-lead, placed in a room heated by steam. By these means a colourless acid of great purity is obtained, which is then packed in casks for sale. The mother-liquors of the first crystallization are again concentrated, and the crystals obtained digested as before described with animal charcoal, until at last, by the accumulation of vegetable and other foreign matters, the liquors are no longer crystallizable; they are then decomposed by means of chalk, and the tartrate of lime thus obtained added to the produce of a new operation. It is found in practice that a slight excess of sulphuric acid is necessary in order to obtain fine crystals of tartaric acid; care however must be taken to guard against the accumulation of sulphuric acid in the process of manufacture, to the risk of destroying the tartaric acid.

With respect to the drying of this acid, there can be no doubt that the centrifugal method of drying would be far superior to the present mode, as the crystals often adhere to the lead-lining of the drying-trays, and having to be forcibly detached, their shape and the general appearance of the acid becomes much impaired; whereas, by the centrifugal mode of drying, the crystals may be obtained of a more perfect and regular shape, and the general appearance of the acid greatly improved.

The principal consumers of tartaric acid are the calico-printers, who use it for the purpose of evolving chlorine from solution of chloride of lime, in the production of white, or what is technically termed discharged patterns upon a coloured ground. Its pharmaceutical uses are too well known to require comment. The *average* annual quantity manufactured in Great Britain may be taken at about 1,000 tons, of which a certain quantity is exported to the continent of Europe and to the United States.

Paratartaric Acid.—There is occasionally to be met with in the market, a tartar obtained from the grapes grown in the department of Vosges, which contains a large proportion of paratartaric or racemic acid. This acid may be distinguished from tartaric acid by its silky needle-shaped crystals, and its insolubility compared with tartaric acid, 100 parts of water at 60° dissolving only 14.1 of racemic acid, whilst 100 parts of water at 60° dissolves 64.8 of tartaric acid. In the second volume of the Records of General Science will be found a series of papers on this acid and its combinations, by Dr. Thomas Thomson. A striking difference between tartaric and racemic acids is exhibited, when we drop solutions of these acids into solution of chloride of calcium. The former occasions no precipitate, while the latter throws down a copious deposit. Thus we see that racemic is a more powerful acid than tartaric. Accordingly, it is capable of decomposing various tartrates, and taking the place of their acid. M. Kestner, a manufacturer of tartaric acid at Thann, a small town in the department of the Vosges, first noticed the existence of this acid about the year 1817. A few months since he called the attention of M. Pelouze to the circumstance, that of late years he had not met with this acid in the ordinary course of manufacturing tartaric acid. It would appear from M. Kestner's letter to M. Pelouze, and which was read at one of the sittings of the Paris Academy of Sciences, that in the years 1822 to 1824, he was in the habit of decomposing the crude tartars he employed by carbonate of lime, using a large excess of sulphuric acid in the decomposition of the tartrate of lime, and passing a current of chlorine gas through the tartaric acid solution for the purpose of removing its colour; but that since 1824 he has been accustomed to decompose the tartar by caustic lime, using a slight excess only of sulphuric acid in the decomposition of the tartrate of lime, and omitting the bleaching process.

During the period he employed the first named process, he frequently detected the presence of paratartaric acid, especially in winter; but from the time of his discontinuing that process up to the present time, he has failed in obtaining the slightest indication of it. He furnishes no analysis of the tartars employed at those respective periods, and confesses himself quite at a loss to account for these phenomena. He concludes by expressing the hope, that the future researches of scientific men may throw some light upon the obscurity in which this subject is at present involved.

Recent investigations have led to the conclusion that most tartars contain a certain portion of paratartaric acid, which is lost in the process at present employed in the manufacture of tartaric acid. This fact may serve to account for the deficient results sometimes obtained.

Manufacture of Sulphate of Potash.—The solution of sulphate of potash, resulting from the decomposition of the neutral tartrate of potash by sulphate of lime, as above mentioned, is run into sheet-iron boilers placed over a coke oven, in which it is concentrated to a certain extent, and is then drawn off into suitable vessels of iron, or wood lined with lead, in which the evaporation is completed by means of steam from the boiler in which the weaker liquors are evaporated, the steam thus generated being made to traverse coils of lead or iron pipe placed in the solution. The sulphate of potash crystallizes as soon as the liquor has acquired a certain density, and falling to the bottom of the vessel, or becoming attached to its sides, is readily fished out by means of strainers; and its superfluous moisture having been allowed to drain out, it is packed in a somewhat damp state in casks ready for sale. In this process the spare heat of the coke oven is made available, and as the complete evaporation of the solution is accomplished by the agency of the steam from the boiler, the greatest possible economy is thus effected as regards fuel. This process is of course applicable to a variety of other purposes where large quantities of weak liquors have to be evaporated, and where a market can be obtained for the coke manufactured. The principal consumers of this impure sulphate of potash are the manufacturers of prussiate of potash: it has also been applied as manure.

Pure sulphate of potash may be obtained by dissolving the impure salt, digesting it with animal charcoal, filtering and recrystallizing.

Bisulphate of potash may also be obtained by heating the impure salt with the requisite excess of sulphuric acid, and proceeding as above.

Mr. A. J. Phillips read a paper a few days since at the Chemical Society on a double salt of sulphate of potash and lime, discovered by him to exist in the deposit from the sulphate of potash liquors in the boilers before mentioned. As this paper will no doubt appear in the Quarterly Journal of the proceedings of the Chemical Society, we will confine ourselves to simply mentioning the constitution of this double salt as furnished by two analyses of Mr. Phillips:—

	No. 1.	No. 2.
Potash	28.52	28.57
Lime	16.99	16.96
Sulphuric acid	48.94	48.55
Water	5.51	5.67
	99.96	99.75

The purchasers of crude sulphate of potash will be much obliged to Mr. Phillips for this communication.

Manufacture of Bicarbonate of Soda.—In our notice of the process employed in the manufacture of tartaric acid, we mentioned that whiting or carbonate of lime was employed for the purpose of taking up the free acid in the bitartrate of potash, this action being attended with a copious evolution of carbonic acid gas; the carbonic acid so liberated, is employed in the manufacture of bicarbonate of soda. For this purpose, a series of two or more square air-tight wooden vessels, lined with lead, and fitted with a perforated false bottom placed about one foot from the lowest part of the vessel, are filled with crystals of carbonate of soda (the common commercial soda), and connection established between them by means of leaden pipes. Into the first vessel of the series, the carbonic acid gas previously passed through water, is introduced, and after a few days the crystals of soda will be found to be converted into bicarbonate, which is then removed, dried, and having been ground to the requisite degree of fineness, packed in casks for sale. Ten cwt. of crystals of soda yield upwards of five cwt. of bicarbonate. The water of crystallization contained in the crystals of the carbonate, passes through the perforated division into the lower compartment of the vessel, whence it is drawn off by means of a cock placed for that purpose, and as it contains a certain portion of soda, it is used in the manufacture of Rochelle salt, which we shall presently describe, or for any other purpose requiring a solution of soda.

It will be obvious, that carbonic acid gas from any other source will do equally as well for the manufacture of bicarbonate of soda as that obtained as above described.

Manufacture of Rochelle Salt.—This double tartrate of soda and potash is prepared in the same apparatus as that described in the manufacture of tartaric acid. A solution of crystals of soda is first made, and to it is gradually added the bitartrate of potash in the form of crude tartar, the free tartaric acid in the bitartrate combines with the soda, carbonic acid is evolved, and the resulting solution is composed of one equivalent of neutral tartrate of soda and one of neutral tartrate of potash. This solution is drawn off, concentrated by evaporation, crystallized, the crystals redissolved and digested with animal charcoal, the solution filtered and re-crystallized; the product obtained consists of colourless crystals of Rochelle salt.

Manufacture of Citric Acid.—In the manufacture of citric acid the same apparatus is employed as we have described under tartaric acid. Into the generator any given quantity of concentrated lime or lemon-juice, as imported from Sicily, is placed, and to it is added as much whiting as will suffice to neutralize the citric acid it contains: carbonic acid gas is evolved, which may be applied to the manufacture of bicarbonate of soda and carbonate of lime, as above mentioned, and citrate of lime is precipitated to the bottom of the generator. The supernatant liquor containing much of the extractive matter of the lime-juice is run off, and as much dilute sulphuric acid added to the citrate of lime as will serve to liberate the citric acid it contains, whilst the sulphate of lime formed is precipitated. The mixture of citric acid and sulphate of lime is then run off to a filter back, arranged in the same way as that described when treating of tartaric acid, and the operations of washing the residuary sulphate on the filter, concentrating the juice by evaporation, and subsequent crystallization and purification, are all precisely similar to those described under tartaric acid. As citric acid is even more liable to decomposition than tartaric acid, still greater care must be taken in its concentration and subsequent treatment. Evaporation in vacuo is particularly desirable in the case of citric acid, and the centrifugal process of drying might also be employed with great advantage.

ON SEA-WEEDS AS THE SOURCES OF ACETIC ACID.

BY JOHN STENHOUSE, LL.D., F.R.S.L. AND E.

During the course of a series of experiments on sea-weeds, an account of which was read before the Royal Society on the 18th of April, 1850, I had frequently occasion to observe that when a quantity of wet sea-weeds was laid together in a heap in a warm situation for any length of time, it soon began to undergo a species of fermentation. This, I am aware, is a circumstance which has been not unfrequently observed; but as no one has hitherto been at the trouble to examine the nature of the acids generated during this fermentation, I was induced to investigate the matter a little more closely.

At the ordinary temperature of Scotland, even during the summer months, the fermentation of sea-weeds proceeds very slowly, requiring from three to four months for its completion; but when the weeds are kept at a temperature of from 90° to 96° F., the process is completed in from two to three weeks.

I. Six pounds of fresh moist *Fucus vesiculosus* were put into an earthenware jar along with a little quicklime, and just sufficient water to cover them, and were kept for three weeks at the temperature of 96° F. Small quantities of quicklime were added from time to time, so as to keep the mixture slightly alkaline. When the fermentation was completed, the liquid portion, which contained a good deal of mucilage and some acetate of ammonia, was thrown upon a cloth filter, and the clear liquid which passed through was evaporated to dryness and then cautiously heated, so as not to decompose any of the crude acetate of lime, while almost the whole of the mucilaginous matter was rendered insoluble. The dark brown mass was digested with a little water, again filtered, and the clear solution evaporated to dryness. It yielded 4 oz. 2 drams of dry acetate of lime, which was almost entirely free from adhering organic matter. When this acetate of lime was distilled with hydrochloric acid, it yielded 29 oz. of a pure but feeble vinegar, 1 oz. of which required 24 grs. of anhydrous carbonate of soda to neutralize it. As, therefore, 662 grs. of anhydrous carbonate of soda require for saturation 650 grs. of anhydrous acetic acid, 1 gr. of anhydrous carbonate of soda may be regarded as equivalent to 1 gr. of anhydrous acetic acid. The 29 oz. of the above-mentioned vinegar, therefore, contained $24 \times 1 \times 29 = 696$ grs. of anhydrous acetic acid. As 1 pound contains 7000 grs., and 6 pounds of fucus, consequently, 42,000 grs., the 696 grs. of anhydrous acetic acid obtained from it, give 1.65 per cent. anhydrous acetic acid as the produce of the wet sea-weed.

II. Twenty-four pounds of fresh *Fucus nodosus*, also in a moist state, were suffered to ferment along with lime at a temperature of 96° F. for about five weeks. Twenty ounces of crude acetate of lime were obtained, which, when distilled with hydrochloric acid, yielded 57 oz. of pretty pure vinegar, each ounce of which saturated 43 grs. of anhydrous carbonate of soda. The amount of the acetic acid in the whole quantity was therefore 2451 grs. =1.45 per cent. of the wet *Fucus nodosus*.

III. Four pounds of fresh *Fucus vesiculosus* were left to ferment in the open air along with quicklime, at the ordinary temperature, from the 8th of June to the 1st of September, when the process was finished. The filtered solution of the acetate of lime, after being evaporated to dryness, when distilled with hydrochloric acid, yielded 46 oz. of weak vinegar, each ounce of which saturated 7 grs. of anhydrous carbonate of soda, amounting therefore in all to 322 grs. of anhydrous acetic acid =1.15 per cent. of the wet sea-weed. Thus it is clear that when sea-weeds are fermented at the ordinary temperature of Scotland, during the summer months, the process goes on much more slowly, and yields a considerably smaller product than when the temperature is retained at about 90° F. Should any person, therefore, think of manufacturing acetic acid from sea-weeds, either in Great Britain or in any of the northern countries of Europe, I would advise him to employ so much artificial heat as to produce a constant temperature of from 90° F. to 96° F. I should expect, however, that in the southern portions of Europe, at least during the summer months, and in tropical countries, artificial heat might probably be dispensed with.

One of the chief uses to which sea-weeds are applied is in manuring land; and with this application, their having been previously employed in the manufacture of vinegar would not very materially interfere. For if the fermented weeds and the salts remaining in the stills were spread upon the land, I apprehend they would prove almost as useful in an agricultural point of view as the fresh sea-weeds would have done.

The vinegar obtained from the Fuci contained a very minute quantity of butyric acid. When it was therefore saturated with carbonate of soda, evaporated to dryness, and the dry salt left for some time in a moist atmosphere, a small portion of it deliquesced. This liquid portion was therefore separated from the solid salt, and was evaporated to dryness. It formed a saponaceous looking, uncrystallizable mass, which had the peculiar odour of the butyrates; and when it was digested with a mixture of alcohol and sulphuric acid, yielded an æther which had the characteristic odour and properties of butyric æther. A silver salt, prepared from this supposed butyrate of soda by double decomposition with nitrate of silver, was found to contain 60.49 per cent. oxide of silver. The calculated quantity of oxide of silver in butyrate of silver, is 59.48; that in acetate of silver, 69.46; and in metacetonate of silver, 64.09 per cent. It appears highly probable, therefore, that the excess of oxide of silver found in the butyrate arose from a slight admixture of either acetic or metacetonic acids.

A silver salt was also prepared by digesting oxide of silver with pure acetic acid from the Fuci. It had all the characters of acetate of silver; and when subjected to analysis, 0.250 of the salt gave 0.161 metallic silver =0.172 oxide of silver=69.16 per cent.; the calculated amount of oxide of silver in the acetate being, as was previously stated, 69.46 per cent.—*Philosophical Magazine.*

ON THE RELATIONS EXISTING BETWEEN CRYSTALLINE FORM, CHEMICAL COMPOSITION, AND THE PHENOMENA OF ROTATORY POLARIZATION.

BY M. L. PASTEUR.

Everybody knows the simple and remarkable law of crystallography enounced by the celebrated mineralogist Haüy, to the effect that the corresponding parts of a crystal are simultaneously and similarly modified. This is the law of symmetry; but it sometimes happens, and Haüy was aware of the principal examples, that this law is subject to exceptions.

1. For reasons which I have stated in a former communication, it is necessary to divide the hemiedric forms into two classes. When a crystal is hemiedric, we may, in some cases, imagine another crystal, identical with the first in all its respective parts, and yet not superposable, much in the same way as the right hand resembles the left, and yet is not superposable. This class of hemiedrics, which may be termed *non-superposable hemiedrics*, is not the only one that can be adduced. The regular tetrahedron and the rhomboid are hemihedric forms, but all regular tetrahedrons are superposable, and all rhomboids of the same angle are so also.

2. In my first communications, so favourably received by the Academy, I showed that there exists a close connexion between non-superposable hemiedrics and the phenomena of molecular rotatory polarization.

3. These points being admitted, a question naturally presents itself to the mind. Do all substances, of which many are now known, which, when in solution, turn the plane of polarization, belong to the class of hemiedric crystalline forms? On the other hand, does the hemiedric form always indicate the existence of the rotatory property? I allude here to the non-superposable hemiedrics, for these questions are already in part solved with reference to the superposable hemiedrics. It is for the solution of these important questions, which are quite distinct from each other, that I am about to adduce some new observations.

The facts which I have collected this year relate to asparagine, aspartic acid, the combination of glucose with chloride of sodium, and formiate of strontia.

4. On examining attentively the crystalline form of asparagine, I discovered, beyond a doubt, that all the crystals of this substance are hemiedric, and that they belong to the class of non-superposable hemiedrics. It was probable, therefore, that this substance would be found to possess the molecular rotatory property, and experience has proved this to be the case. The rotatory power of asparagine is left-handed when the asparagine is dissolved in water or in alkalies; but on the contrary it is right-handed, and to a much greater relative extent, when the asparagine is dissolved in the mineral acids.

5. The relations which connect asparagine and aspartic acid, indicate the probable existence of rotatory properties in the latter. In fact, aspartic acid does deviate the plane of polarization of a ray of light, and its rotatory power is analogous to that of asparagine.

6. Moreover, the recent researches of chemists having tended to prove that asparagine is the amide of malic acid, I was induced to examine the rotatory power of malic acid and the malates. Experience here again fulfilled my expectations. Malic acid and its salts possess the property of turning the plane of polarization of a ray of light, and I found that many of the malates belong to the class of non-superposable hemiedrics. But there is one fact to which I wish to allude with reference to malic acid. This acid resembles in its rotatory power the peculiarities of the right and left-handed tartaric acid; and the discovery of this analogy naturally led to the conclusion that there would be found to be an intimate relation in the dissymmetric molecular arrangement in these acids. It is very probable that there may exist between malic and either right-handed or left-handed tartaric acid, a similar molecular grouping, with such modification as may be caused by the difference in the composition of the acids.

This idea, suggested by the physical properties, of the existence of a similar molecular grouping in malic acid and one of the two tartaric acids, is far from being opposed to the appearances presented in the organism. In vegetables, wherever malic acid is found tartaric acid is also found, and *vice versa*. Probably nature uses one of these acids for the production of the other. This remark leads even to the supposition that the molecular grouping in question may be common to malic acid and ordinary right-handed tartaric acid, for it is this kind of tartaric acid that is found associated with malic acid in acid fruits. The relations existing between the right and left-handed tartaric acids give importance to these inferences. For, if there exists a dissymmetric molecular grouping common to right-handed tartaric and the malic acid of the mountain ash, we may presume, from analogy, that there also exists a molecular grouping common to left-handed tartaric acid and a malic acid yet undiscovered, which will be to the malic acid of chemists what left-handed tartaric acid is to right-handed tartaric acid. In other terms, there will be two malic acids, one right-handed, and the other left-handed, just as there are two tartaric acids.

7. I have given, in my former papers, a detailed examination of the

crystallized form and rotatory power of the combination of glucose with chloride of sodium. I regret that I cannot here enter into the peculiarities of the crystalline form of this combination. I will only observe that it belongs to the class of non-superposable hemiedrics, that it belongs to the system of the right rhomboidal prism, and that all its crystals, although apparently perfectly transparent and simple, are nevertheless the result of the grouping of several crystals, as in cases of aragonite, sulphate of potash, &c.

8. The last subject to which I have to refer, is, the examination of the crystallization of formiate of strontia. If we study with care the crystals of formiate of strontian, we find, that in all the crystallizations of this salt, there are always two kinds of crystals, the one right-handed hemiedric, the other left-handed hemiedric, identical, but not superposable. Nevertheless, if we isolate these two salts and dissolve them separately, neither the one nor the other will affect a ray of polarized light. This leads to the supposition that the hemiedrism of formiate of strontia does not depend upon the arrangement of the atoms in the chemical molecule, but on the arrangement of the physical molecules in the entire crystal, in such a manner, that when the crystalline form disappears in the process of solution, there is no longer dissymmetry; just as if an edifice be constructed having a poliedric external form of a non-superposable hemiedric, and this be subsequently destroyed, the original dissymmetric character will not be retained by the separate parts. Moreover, on recrystallizing either the right-handed or left-handed crystals o fformiate of strontia, each separate kind yields both species of crystals.

We see then that the hemiedric, and even the non-superposable hemiedric form, exists in these crystals without being accompanied by the molecular rotatory property, of which an example is afforded in quartz. If the analogy with quartz were complete, the formiate of strontia would possess the rotatory property in the crystalline state, sometimes turning to the right, and sometimes to the left, like the two varieties of quartz, unless the existence of two optic axes in the formiate should prevent the phenomenon.

I have already noticed a substance having a non-superposable hemiedric form without its being accompanied by the molecular rotatory property: I allude to sulphate of magnesia.

But I must add that formiate of strontia and sulphate of magnesia present peculiarities in their crystalline forms, which would induce me to expect the absence of all rotatory power in these substances, although they belong to the class of non-superposable hemiedrics.

In fact, an examination of the angles of the crystal of formiate of strontia shows that if one of the angles differed only to the extent of one degree seventeen minutes, it would be impossible, by turning the crystals, to distinguish a right-handed from a left-handed crystal, and the hemiedrism of formiate of strontia would become superposable. But up to the present time in all those cases which I have examined, I have never found the rotatory property to co-exist with superposable hemiedrism, and I have strong reasons to believe it is not possible.

It is very curious that sulphate of magnesia and the substances isomorphous with it, possess an analogous peculiarity. In fact, the form of these sulphates is a right prism with a rhombic base, having two modifications on the edges parallel to each base, tending to an irregular tetrahedron. This is the non-superposable hemiedrism. But the angle of the prism of these sulphates is from 90° to 91°, and the right rhomboidal prism assimilates closely to the prism with a square base. It follows that the hemiedrism, although strictly non-superposable, is only a few minutes removed from the superposable, which is not at present known to possess the rotatory property.—*Repertoire de Pharmacie.*

EXHIBITION OF INDUSTRY, 1851.

The Local Committees appointed in the British Colonies to assist in the collection and transmission of raw or manufactured products to the Exhibition of Industry, have, in several instances, drawn up interesting lists of the objects obtainable in each place respectively, and which serve to illustrate the natural history and productive resources of these countries. Two of these, one for British Guiana, the other for Barbados, we subjoin.

1. BRITISH GUIANA.

List of Articles which appear to be most desirable for Exhibition.

Section 1.—*Raw Materials and Produce.*

A.—MINERAL KINGDOM.

White sand from the Sand Hills, Demerara River, and from the sand banks above the Falls of the Essequebo
Black sand from the Essequebo River
Burnt clay for cement
Any earth suitable to form cement
Bricks, draining-tiles, and tubes manufactured in this colony
Any earth known or supposed to be applicable to manufacture or art.
Ores or rocks supposed to contain metallic substances
A series of clays and other strata from an artesian boring
Any mineral paint or preservative, the produce of, or discovered in this colony, the composition not being divulged
"Pegass," dried or in a compressed state, suitable for fuel
Miscellaneous articles from the mineral kingdom

B.—VEGETABLE KINGDOM.

1st. *Agricultural Produce, Cereals, &c.*

Vacuum pan sugar from cane
Muscovado ditto
Molasses
Grape sugar from bananas or plantains, with an account of the process used to obtain it
Dried sugar cane
Rice (*Oryza sativa*), with and without the husk
Hay grown and made in the colony
Dried specimens of grasses used, or capable of being used as pasture or hay
Maize, or Indian corn (*Zea Mays*)
Guinea corn, varieties of, as close headed white (*Sorghum vulgare*), two coloured (*S. bicolor*), Drooping (*S. cernuum*), panicled yellow seeded (*S. saccharatum*)
Beans, peas, and lentils of all kinds
Meals from the same

2nd. *Fibrous Substances for Clothing, &c. &c.*

Cotton, varieties of (*Gossypium arboreum, &c.*)
Silk grass, different kinds, from *Agave Americana,* and *vivipara, Bromeliæ, &c.*
Plantain fibre, from different species of *Musa*
Maho or Mohoe ditto (*Thespesia populnea*, or *Hibiscus elatus?*)
Fibre from seeds of silk cotton tree (*Bombax Ceiba*)
Fibre of *Urena?* a very common plant, some with yellow, others with white flowers, belonging to the mallow or ochroe tribe; common on the road sides throughout the colony
Cocoanut husks for domestic purposes, and cordage
Fibre of the Ita palm (*Mauritia flexuosa*)
Arrows or flowers of the sugar cane

3rd.—*Fruits, Seeds, Roots, &c.*

Coffee (*Coffea arabica*)
Chocolate (*Theobroma Cacao*) prepared and in seed
Dried unripe plantains (*Musa paradisiaca*)
Ditto sliced, and meal from the same (Conquin-tay)
Dried ripe plantains
Ditto bananas (*Musa sapientum*)
Dried sorrel (*Hibiscus Sabdariffa*)

Dried ochroes (*Hibiscus esculentus*)
Seeds of ditto
Dried guavas (*Psidium pyriferum*)
Ditto mesples (*Blakea triplinervia*)
Bitter cassava (*Janipha Manihot*)
Meal from the same
Ditto baked into bread
Tapioca from the same
Cassareep, or inspissated juice of the same
Sweet cassava (*Janipha Loeflingii*)
Buck yams (*Dioscorea triphylla*)
Common ditto (*D. sativa*)
Guinea ditto (*D. aculeata*)
Barbados ditto (*D.* —— ?)
Sweet potatoes (*Convolvulus Batatas*, or *Batatas edulis*)
Eddoes (*Colocasia esculenta*)
Tannias, varieties known under the following names:—Roasting eddoes (*Caladium macrorrhizum*), spinache or Indian kale (*C. nymphæfolium*), nut eddoes (*C. sagitæfolium*)
Arrowroot (*Maranta arundinacea*)
Indian shot, or Tous-les-mois, species or varieties known as *Canna coccinea*, *C. lutea*, *C. occidentalis*, and *C. Achiras*
A series of starches from the above and other starch producing plants of the colony
Bread fruit and bread nuts (*Artocarpus incisa*)
Ground nuts (*Arachis hypogæa*)
Dried ginger (*Zingiber officinale*)
Dried peppers of various kinds, as buckramanni, negro, bonnet, bird, cherry, &c. (*Capsicum annuum*, *frutescens*, *baccatum*, *&c.*)
Cayenne peppers from the same
Vanilla—fruit of *Vanilla aromatica*
Brazil nuts in capsule (*Bertholettia excelsa*)
Saouari nuts (*Caryocar tomentosum*)
Sago from any palm, particularly the common cabbage palm (*Areca oleracea*)

4th. Oils, Resins, Gums, &c.

Oil from the seeds of the "Monkey pot" (*Lecythis Zabucajo*), either extracted, or a sufficient quantity of the seeds to be forwarded
Ditto ditto, "Crab oil" (*Carapa guianensis*)
Ditto ditto "Wangala," (*Sesamum orientale*)
Oil from the seeds of the "Saouari" (*Caryocar tomentosum*)
Ditto ditto, "Sand box" (*Hura crepitans*)
"Laurel oil," from species of *Laurus* or *Nectandra*? with a dried botanical specimen of the flower and fruit
Fatty oil from the seed of the "Butter tree" (*Caryocar butyrosum*) with the seeds
Ditto from the "Tallow tree" (*Myristica sebifera*)
Fatty oil from the "Pitch tree" (*Icica guianensis*)
Cocoanut oil (*Cocos nucifera*)
Butter of cocoa, or chocolate fat (*Theobroma cacao*)
Castor oil (*Ricinus communis*)
Tonkin or tonka bean, and oil (*Dipterix odorata*)
Oil from Acuyuri Palm (*Astrocaryum aculeatum*)
Ditto from Cucurit palm (*Maximiliana regia*)
Specimen of the resin collected from the disk of the "Wax flower" (*Clusia insignis*) common at the sand hills, Ampa, and elsewhere
Ditto milky resin from the "Hya Hya," or "Milk tree" (*Tabernæmontana utilis*)
Ditto balsam of copaiba. There are several trees supposed to yield this balsam, not yet botanically determined
Ditto resin of conima from the "Hyawa," or incense tree (*Icica heptaphylla*)
Gum animi from the root of the "Simiri" or "Locust tree" (*Hymenæa courbaril*), very common on the Arabian coast
Gum resin resembling gamboge, from *Vismia Guianensis*
Ditto from various species of *Garcinia* and *Clusia*
Gum resin from lignum vitæ (*Guiacum officinale*)
Balsam of acouchi, from *Icica Aracouchini*
Gum resembling gum elemi, from *Icica Carana*
Balsam of Umiri, from *Humirium floribundum*
Caoutchouc, or Indian rubber
Specimens of torches from the "Mannaballi" or "Candle wood" (*Amyris* or *Icica*?)

Dried specimens of the flower and fruit of the trees yielding the above

5th. *Acids.*

Citric acid from the different species of limes, oranges, lemons, shaddocks, &c., with the relative yields, and a description of the processes used

Malic acid from the sour-sop (*Anona muricata*)

Malic acid from the tamarind (*Tamarindus indica*)

Oxalic acid from sorrel (*Hibiscus Sabdariffa*

Vinegars from sugar cane, plantain, bananas, or other sources

6th.—*Dyes and Colours.*

Indigo dye (*Indigofera tinctoria* and *Anil*)

Arnotto ditto, or rocou (*Bixa Orellana*)

Plantain ditto (*Musa paradisiaca*)

Wild plantain (*Urania guianensis*), common in Camouni and other creeks

Lana ditto (*Genipa Americana*)

Maho or Mohoe ditto (*Thespesia populnea*, or *Hibiscus elatus?* common on the sea-shore

Chica ditto (*Bignonia Chica*)

Avogado, or Alligator pear-seed ditto (*Persea gratissima*)

7th.—*Tanning Substances.*

Mora wood and bark (*Mora excelsa*)

Courida bark (*Avicennia nitida* and *tomentosa*)

Cashew ditto (*Anacardium occidentale*)

Hog-plum ditto (*Spondias lutea*)

Bark of *Malpighia* ——? abundant on the savannahs in the interior, and much used by the Brazilians

8th.—*Intoxicating Drugs and Medicinal Substances.*

Tobacco (*Nicotiana Tabacum*)

Ouralli or Worali poison

Conami (fish poison) with dried specimens of fruit and flower

Hy-yarri or Hai-ari (fish poison), specimen of the wood and bark (*Lonchocarpus Nicou*)

Bark and seed of the Greenheart (*Nectandra Rodiæi*)

Cashew bark (*Anacardium occidentale*)

Hogplum bark (*Spondias lutea*)

Guava bark (*Psidium pyriferum*)

"Piaba" dried leaves and flowers (*Lantana Camara*)

Quassia or bitter wood (*Quassia amara, &c.*)

Four o'clock root (*Mirabilis Jalapa*)

"Many root," a small herb with blue flowers, well known to Barbadians (*Ruellia tuberosa*)

Pink root (*Spigelia anthelmintica*)

Bastard ipecacuanha (*Asclepius curassavica*)

Mangrove tree bark (*Rhizophora racemosa*)

Cardamoms, species of *Amomum*, *Elettaria*, and *Alpinia*

Sarsaparilla roots, and "Duroquaro" of the Indians. Several kinds are said to be found in the interior.

Sassafras, or "Puchury" of the Indians, nuts, roots, and bark (*Laurus Pucheri, Nectandra Puchury minor*, &c.)

Guinea pepper (*Amomum Grana Paradisi A. Melegueta*)

Seeds of the "Shell plant" (*Alpinia nutans*)

Bark and seeds of "Anda" or "Anda-Acu" (*Anda Gomesii*)

Angostura bark "Orayuri" of the natives (*Galipea Cusparia*, and *officinalis*)

Sapodilla bark (*Achras Sapota*)

Wood and bark of sea-side grape (*Coccoloba uvifera*)

Calabash fruit and syrup (*Crescentia Cujete*)

Cowhage. or cowitch (*Mucuna pruriens*)

Lemon-grass (*Andropogon Schœnanthus*)

Bark of the mammee-apple tree (*Mammea Americana*)

Seeds and milky juice of the papaw (*Carica Papaya*)

Simaruba bark, of tree and root (*Simaruba amara*)

Mudar, from *Calotropis gigantea*

Ackawai or waccawai nutmeg (*Acrodiclidium Camara*)

Fruit of the wild cucumber, producing *Elaterium*, common throughout the colony

Bushrope or climber, called Boeiari.

"Toyo," leaves and stems

9th.—*Timber for Building, Shipping, and other purposes, and Ornamental Woods.*

Greenheart, or Siperi (*Nectandra Rodiæi*)
Black greenheart
Purpleheart, or Mariwayana, of which "wood skins" are made
Mora (*Mora excelsa*)
Wallaba, or shingle wood
Siruaballi, or silverbally (*Laurus* or *Nectandra?*)
Hubaballi
Haiawa-balli, or zebra wood
Ducaballi, Youraballi, or Guiana mahogany
Ducallaballi, or Brazilian beef-wood
Itikiribura-balli, or tiger wood
Determa
Crabwood (*Carapa guianensis*)
Kakaralli
Wamara, or club wood
Washiba, or bow wood
Bully-tree, or burruch
Camara, or tonkin bean (*Dipterix odorata*)
Carana, wahli, or cedar wood
Hucouya, or iron wood
Bourra-courra, paira, or letter wood
Simiri, or locust wood, (*Hymenoea Courbaril*)
Yari-yari, or lancewood
Yarura, or paddle wood (*Aspidosperma excelsum*)
Souari nut-tree (*Caryocar tomentosum*)
Souradanni, Sarabadanni, Itaballi, Dakumballi, Yawaraballi, Marsiballi, Mannaballi, Kantaballi, and all other trees yielding woods adapted to useful or ornamental purposes.

The specimens of all the woods to be in both vertical and horizontal sections. The former to be not less than three feet in length, and, in breadth, the entire diameter of each trunk; the latter to be through the entire diameter of each trunk, and the height from the ground from whence the section is made specified. If parties have not the means of making the sections required, it is requested that they will transmit to the Committee a portion of the trunk of each tree with the bark upon it, from which sections as above described can be made. The ornamental woods to have one side of the vertical section polished and the other rough. If possible, the age, or supposed age, of the tree from which each section is taken should be stated.

10th. *Miscellaneous Articles.*

The distilled liquor from the pulp of the fruit of the cocoa-tree (*Theobroma Cacao*)
Dried specimen of the "Pink potatoe" used in the preparation of the fermented liquor called cassiri
Preserves and pickles made from the fruits and other productions of the colony, as the pine-apple, lime, citron, mango, mammee-apple, guava, guava-berry, cabbage palm, papaw, tomato, ginger, &c.
Seeds of *Lecythis ollaria*, and specimens of the bark used by the Indians as wrappers for cigars
Drupes or fruit of *Caryocar nuciferum* (Saouri, Aubli), a forest tree in the woods of Essequebo and Berbice
Vegetable ivory, or seeds of *Phytelephas macrocarpa*, a palm
Fronds or leaves of the troolie palm (?) prepared and unprepared as thatch
Specimens of the fruits and vegetable productions of the colony, preserved in a concentrated solution of salt, or in diluted pyroligneous acetic acid
Dried specimens of the flower and fruit of any indigenous plants, either little known or undescribed, yielding, or supposed to yield, any useful product, accompanied by specimens of the product, if procurable, and explanations and remarks
Any articles from the vegetable kingdom used at present by the natives of British Guiana, either for food or manufactures, or supposed to be applicable to those purposes, not specified in the above list.

C.—ANIMAL KINGDOM.

Substances used as food.—Honeys (varieties), with specimens of the cells and of the bees which produce them.

Substances used in Manufactures.—Glue, from the "Kilbagre," or "Gilbacker" (*Silurus*——?)

Section 2.—*Machinery, and Models of new Inventions, or Improvements, in Manufacturing or Agricultural Machines and Implements.*

Section 3.—*Any species of Article manufactured in the Colony for domestic or ornamental purposes, either from clay, wood, textile, or other substances.*

Articles of Indian manufacture, such as pots, goglets, &c., woodskins, paddles, war, hunting, and fishing implements, models of Indian or buck houses, corials, &c., hammocks of cotton, silkgrass &c., either plain or ornamented, "Pegalls," and basket work; "Matapis," or cassava presses; "Etamis," or cassava sifters; articles of dress or ornament made of skins, feathers, bones, or teeth, shells, elytra, or beetle wings, seeds of soap-berry (*Sapindus Saponaria*), "Job's Tears" (*Coix lacryma*), &c.

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2. BARBADOS.

A List of Objects which may be admitted to the Exhibition of the Works of Industry of all Nations, 1851, *and obtainable in Barbados.*

Section 1.—*Raw Materials and Produce.*

A.—MINERAL KINGDOM.

Quartz, in coarse grains, pure and white, from Chalky Mount, used in glass and china making
Selenite, gypsum crystallized, (pigeon salt)
Bituminous coal or compact asphalt (manjack)
Petroleum (green tar)
Septaria, nodular limestones, intersected with calc-spar, found in the clays of Scotland, used for making cement (?)
Chalk (impure) supposed capable of being made into hydraulic cement (?)

B.—VEGETABLE KINGDOM.

1. *Agricultural Produce, &c.*

Muscovado sugar
Vacuum pan ditto
Gadesden pan ditto
Indian corn (*ZeaMays*), its varieties
Guinea corn (*Sorghum vulgare*), ditto
Sweet potatoes (*Convolvulus Batatas*) seeds of the numerous varieties
Dried ochres (*Hibiscus esculentus*) the seeds of ditto
Starches
- Cassava (*Janipha Lœflingii, J. Manihot*) the starch
- Arrowroot (*Maranta arundinacea*) ditto
- Tous-le-mois (*Canna coccinea, C. edulis*) ditto

Ground nuts (*Arachis hypogœa*)
Para grass, dried specimen
Pumpkins (*Cucurbita pepo*)
Pigeon peas (*Cajanus flavus*)

2. *Spices and Condiments.*

Dried peppers (*Capsicum*), various species and varieties
Cayenne pepper
Dried ginger (*Zingiber officinale*)
Preserved ditto
Cabbage-tree blossom, pickles of (*Oreodoxa oleracea*)
Bayberries (*Eugenia acris*)
Tamarinds, preserved (*Tamarindus indica*)
Cassirrepe prepared from the *Janipha Manihot*
Pickles, varieties of
Guava jelly, &c.

3. *Dyes.*

Yellow Hercules (*Xanthoxylon ochroxylon*) the bark
Fustic (*Morus tinctoria*), the wood

Anatto (*Bixa orellana*)
Akasee (*Acacia tortuosa*) the pods
Logwood (*Hæmatoxylon campechianum*)

4. *Medical Substances.*

Castor oil (*Ricinus communis*) seeds and oil
Horsenicker (*Guilandina Bonducella*) seeds
Tamarinds
Aloes (*Aloes vulgaris*)
White lily (*Pancratium caribbeam*) bulbs
Manyroot (*Ruellia tuberosa*) the roots
Cowitch (*Mucuna pruriens*) the pods
Hollyhock (*Argemone Mexicana*) seeds
Bellyache (*Jatropha gossipifolia*) seeds
Physic nut (*Jatropha curcas*) ditto
French physic nut (*Jatropha multifida*) ditto
Indian root or bastard ipecacuanhæ (*Asclepias curasavica*)
Cassia fistula (*Cassia fistula*)
Musk ochre (*Hibiscus abelmoschus*)
Lemon grass (*Cymbopogon schænanthus*)

5. *Fibrous Substances, Cordage, and Clothing Materials.*

Silk Grass (*Agave Americana, A. vivipera*) the fibre for cordage
Spanish needle (*Yucca draconis*) the fibre for cordage
Cotton (*Gossipium herbaceum, G. barbadense, G. vitifolium*
Silk cotton (*Bombax ceiba*) the down of the fruit

6. *Miscellaneous Substances.*

Preserved specimens of fruits, and the vegetable productions of Barbados
Any articles of the vegetable kingdom applicable for food, manufactures, and pharmaceutical purposes, not enumerated in the above lists

Section 2.—Machinery.

Models of manufacturing or agricultural machines.

Section 3.—Manufactures.

Any article manufactured in Barbados for domestic or ornamental purposes, viz:—
Wax fruit or productions of the Colony—(wax models of the Bourbon and transparent cane).
Basket and bag work, made from the seed of the mimosa (*Dismanthus virgatus*).
Bracelets and Necklaces of Soapberry seeds (*Sapindus saponaria.*)

SUBSTITUTION OF SOLANUM NIGRUM FOR ATROPA BELLADONNA.

BY MR. R. W. GILES.

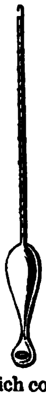
An attempt on the part of a herbalist, who, I believe, was perfectly innocent of intentional fraud, to supply solanum nigrum in place of atropa belladonna, came under my notice last year, and at the time appeared no more than a solitary instance unworthy of record; but the perusal of a precisely parallel case, published by Mr. Herman Schweitzer, of Brighton, in the Pharmaceutical Journal for April, 1842, vol. i., p. 517, seems to indicate that the substitution is not confined to one collector, or to one locality; but is, probably, so widely extended as to exercise an important influence upon the authenticity of our pharmaceutical preparations. The pertinacity of the collector in maintaining the verity of the specimen was an exact copy of Mr. Schweitzer's relation, with the same profound contempt for my different opinion, while every endeavour to point out the absence of the proper characteristics was silenced by a dogmatical assertion, that she (the collector was a woman) had been in the habit of supplying the pseudo belladonna for years without ever having had an objection raised. I was entirely unsuccessful in convincing her, and there can be no doubt that the same practice will be continued at the proper season, year after year, so long as an unquestioning market is to be found. It does not, therefore, seem improper to call attention again to an old tale, not for the purpose of repeating the individual caution already given, but to apply the force of it to the whole system, and to conclude that Pharmaceutists, who claim a dignity from the responsibility of their duties, cannot, without criminal indifference, transfer their trust to ignorant and irresponsible herbalists, but that they are required to distinguish carefully for themselves the species of the plants derived from such sources.

Clifton, January 11, 1851.

DESCRIPTION OF AN AMMONIA-METER.

BY JOHN JOSEPH GRIFFIN, F.C.S.

I TAKE the liberty of presenting to the Chemical Society a Hydrometer for determining the strength of solutions of Ammonia. I think it may be interesting to the society, because it is founded on a chemical principle, while its indications are such as adapt it to the use of the manufacturer.



In a memoir which the Society did me the honour to insert in their Transactions four years ago,* I recited some experiments to prove that mixtures of liquid ammonia with water possess a specific gravity which is the mean of the specific gravities of their components; that in all solutions of ammonia, a quantity of anhydrous ammonia, weighing 212½ grains, which I call a *Test-atom*, displaces 300 grains of water, and reduces the specific gravity of the solution to the extent of .00125; and, finally, that the strongest solution of ammonia which it is possible to prepare at the temperature of 62° Fah. contains in an imperial gallon of solution, one hundred test-atoms of ammonia. The new Ammonia-Meter is founded upon those facts.

The form of the instrument is that of an ordinary glass hydrometer, with a paper scale showing 100 degrees. Every degree indicates one test-atom, or 212½ grains, of anhydrous ammonia, in the gallon of solution. The zero of the scale signifies pure water at the temperature of 62° Fah. The first degree signifies one test-atom of ammonia, and the hundredth degree 100 test-atoms. The specific gravity of the liquor which corresponds with 100° of strength is .875, water being taken at 1.000.

To render the indications afforded by this instrument useful to manufacturers, I have prepared a table which shows the constitution of the hundred solutions of ammonia corresponding with the hundred degrees of the instrument. The table contains six columns of numbers. The first column shows the *specific gravity* of the solutions; the second column, the *weight* of an imperial gallon in avoirdupois pounds and ounces; the third, the *percentage* of ammonia by weight; the fourth column, the *degree* of the solution as indicated by the instrument, corresponding with the number of *test-atoms* of ammonia present in a gallon of the liquor; the fifth column shows the number of *grains* of ammonia contained in a gallon; and the sixth column, the *atomic volume* of the solution, or that *measure* of

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* On the Constitution of Aqueous Solutions of Acids and Alkalies. Mem. Chem. Soc., III, 188.

TABLE OF LIQUID AMMONIA.

One Test-Atom of Anhydrous Ammonia = NH_3 weighs 212.5 grains.

Sp. Gr. of Water = 1.00000. One Gallon of Water weighs 10 lbs. and contains 10,000 Septems. Temperature 62° Fah.

Specific gravity of the liquid ammonia.	Weight of an imperial gallon in avoirdupois lbs. and ozs.	Percentage of ammonia by weight.	Test-atoms of ammonia in one gallon.	Grains of ammonia in one gallon.	Septems containing one test-atom of ammonia.	Specific gravity of the liquid ammonia.	Weight of an imperial gallon in avoirdupois lbs. and ozs.	Percentage of ammonia by weight.	Test-atoms of ammonia in one gallon.	Grains of ammonia in one gallon.	Septems containing one test-atom of ammonia.	Specific gravity of the liquid ammonia.	Weight of an imperial gallon in avoirdupois lbs. and ozs.	Percentage of ammonia by weight.	Test-atoms of ammonia in one gallon.	Grains of ammonia in one gallon.	Septems containing one test-atom of ammonia.
	lb. oz.						lb. oz.						lb. oz.				
.87500	8 12.	34.694	100	21250.9	100.00	.91750	0 2.8	21.837	66	14025.0	151.51	.95875	9 9.4	10.4490	33	7012.5	303.03
.87625	8 12.2	34.298	99	21037.5	101.01	.91875	9 3.0	21.477	65	13812.5	153.85	.96000	9 9.6	10.1190	32	6800.0	312.50
.87750	8 12.4	33.903	98	20825.0	102.04	.92000	9 3.2	21.118	64	13000.0	156.25	.96125	9 9.8	9.7901	31	6587.5	322.58
.87875	8 12.6	33.509	97	20612.5	103.09	.92125	9 3.4	20.760	63	13387.5	158.73	.96250	9 10.0	9.4620	30	6375.0	333.33
.88000	8 12.8	33.117	96	20400.0	104.16	.92250	9 3.6	20.403	62	13175.0	161.29	.96375	9 10.2	9.1347	29	6162.5	344.83
.88125	8 13.0	32.725	95	20187.5	105.26	.92375	9 3.8	20.046	61	12962.5	163.93	.96500	9 10.4	8.8083	28	5950.0	357.14
.88250	8 13.2	32.335	94	19975.0	106.38	.92500	9 4.0	19.691	60	12750.0	166.67	.96625	9 10.6	8.8827	27	5737.5	370.37
.88375	8 13.4	31.946	93	19762.5	107.53	.92625	9 4.2	19.337	59	12537.5	169.49	.96750	9 10.8	8.1580	26	5525.0	384.62
.88500	8 13.6	31.558	92	19550.0	108.70	.92750	9 4.4	18.983	58	12325.0	172.41	.96875	9 11.0	7.8341	25	5312.5	400.00
.88625	8 13.8	31.172	91	19337.5	109.89	.92875	9 4.6	18.631	57	12112.5	175.44	.97000	9 11.2	7.5111	24	5100.0	416.67
.88750	8 14.0	30.785	90	19125.0	111.11	.93000	9 4.8	18.280	56	11900.0	178.57	.97125	9 11.4	7.1888	23	4887.5	434,78
.88875	8 14.2	30.400	89	18912.5	112.36	.93125	9 5.0	17.929	55	11687.5	181.82	.97250	9 11.6	6.8674	22	4675.0	454.54
.89000	8 14.4	30.016	88	18700.0	113.64	.93250	9 5.2	17.579	54	11475.0	185.18	.97375	9 11.8	6.5409	21	4462.5	476.19
.89125	8 14.6	29.633	87	18487.5	114.94	.93375	9 5.4	17.231	53	11262.5	188.68	.97500	9 12.0	6.2271	20	4250.0	500.00
.89250	8 14.8	29.252	86	18275.0	116.28	.93500	9 5.6	16.883	52	11050.0	192.31	.97625	9 12.2	5.9082	19	4037.5	526.32
.89375	8 15.0	28.871	85	18062.5	117.65	.93625	9 5.8	16.536	51	10837.5	196.08	.97750	9 12.4	5.5901	18	3825.0	555.56
.89500	8 15.2	28.492	84	17850.0	119.05	.93750	9 6.0	16.190	50	10625.0	200.00	.97875	9 12.6	5.2728	17	3612.5	588.24
.89625	8 15.4	28.113	83	17637.5	120.48	.93875	9 6.2	15.846	49	10412.5	204.08	.98000	9 12.8	4.9563	16	3400.0	625.00
.89750	8 15.6	27.736	82	17425.0	121.95	.94000	9 6.4	15.502	48	10200.0	208.33	.98125	9 13.0	4.6406	15	3187.5	666.67
.89875	8 15.8	27.359	81	17212.5	123.46	.94125	9 6.6	15.158	47	9987.5	212.77	.98250	9 13.2	4.3255	14	2975.0	714.29
.90000	9 0.0	26.984	80	17000.0	125.00	.94250	9 6.8	14.816	46	9775.0	217.39	.98375	9 13.4	4.0116	13	2762.5	769.23
.90125	9 0.2	26.610	79	16787.5	126.58	.94375	9 7.0	14.475	45	9562.5	222.22	.98500	9 13.6	3.6083	12	2550.0	833.33
.90250	9 0.4	26.237	78	16575.0	128.21	.94500	9 7.2	14.135	44	9350.0	227.27	.98625	0 13.8	3.3853	11	2337.5	909.09
.90375	9 0.6	25.865	77	16362.5	129.87	.94625	9 7.4	13.795	43	9137.5	232.56	.98750	9 14.0	3.0741	10	2125.0	1000.00
.90500	9 0.8	25.493	76	16150.0	131.58	.94750	9 7.6	13.456	42	8925.0	238.09	.98875	9 14.2	2.7632	9	1912.5	1111.10
.90625	9 1.0	25.123	75	15937.5	133.33	.94875	9 7.8	13.119	41	8712.5	243.90	.99000	9 14.4	2.4531	8	1700.0	1250.00
.90750	9 1.2	24.754	74	15725.0	135.13	.95000	9 8.0	12.782	40	8500.0	250.00	.99125	9 14.6	2.1438	7	1487.5	1428.60
.90875	9 1.4	24.386	73	15512.5	136.98	.95125	9 8.2	12.446	39	8287.5	256.41	.99250	9 14.8	1.8352	6	1275.0	1666.70
.91000	9 1.6	24.019	72	15300.0	138.89	.95250	9 8.4	12.111	38	8075.0	263.16	.99375	9 15.0	1.5274	5	1062.5	2000.00
.91125	9 1.8	23.653	71	15087.5	140.85	.95375	9 8.6	11.777	37	7862.5	270.27	.99500	9 15.2	1.2204	4	850.0	2500.00
.91250	9 2.0	23.288	70	14875.0	142.86	.95500	9 8.8	11.444	36	7650.0	277.78	.99625	9 15.4	0.9141	3	637.5	3333.30
.91375	9 2.2	22.924	69	14662.5	144.93	.95625	9 9.0	11.111	35	7437.5	285.71	.99750	9 15.6	0.6087	2	425.0	5000.00
.91500	9 2.4	22.561	68	14450.0	147.06	.95750	9 9.2	10.780	34	7225.0	294.12	.99875	9 15.8	0.3040	1	212.5	10000.00
.91625	9 2.6	22.198	67	14237.5	149.25							1,0000	10 lbs.	Water.	0		
1.	2.	3.	4.	5.	6.	1.	2.	3.	4.	5.	6.	1.	2.	3.	4.	5.	6.

it which contains one test-atom of ammonia. The horizontal lines represent the various equivalents of every degree of ammonia indicated by the instrument.

The ammonia-meter and the table together will enable a manufacturer to determine, not only the actual strength of any given liquor, but the precise amount of dilution necessary to convert it into a liquor of any other desired strength. Thus, a liquor indicating 96° by this instrument has a specific gravity of .88, and another indicating 32° has a specific gravity of .96. If the strong liquor is to be diluted to form the weak liquor, the numbers in column 6 of the table show, that 104.16 measures of the former must be diluted to 312.5 measures of the latter.

The direct quotation of the number of grains of ammonia contained in a gallon of solution enables one to judge at a glance of the money value of any given sample of ammonia. Finding that a liquor at 33° contains about one pound of ammonia; a second liquor at 66°, two pounds; and a third at 99°, three pounds, in the gallon, we perceive at once the relative value of these liquors.

The degrees of this instrument mark the strength of solutions of ammonia in a more comprehensible manner than is done by a statement of their specific gravities. Thus, the weak liquid ammonia of the London Pharmacopœia has a specific gravity of .96, and that of the Dublin Pharmacopœia a specific gravity of .95. A gallon of the latter weighs only $1\frac{6}{10}$ ounce less than a gallon of the former. These comparisons do not appear to indicate any great difference in the strength of the liquors; yet the new ammonia-meter marks the London ammonia as of 32° and the Dublin ammonia as of 40°; and the respective strengths of the liquors agree with these numbers, the Dublin solution containing 25 per cent. more ammonia than the London solution.

In proposing to determine the strength of solutions of ammonia by a hydrometric process, I do so in accordance with the practice of chemical manufacturers; but I may add, that, in point of accuracy, the best hydrometer that can be made stands, for such a purpose, far behind the chemical process of centigrade testing. This arises from the fact, that the density of ammonia in solution closely approximates to the density of water. A gallon of water weighs only twenty ounces more than a gallon of the strongest solution of ammonia. The extreme difference between the specific gravities of the two liquids is only .125. Every degree of the ammonia-meter shows the hundredth part of that difference, and therefore indicates an alteration equal to $\frac{1}{5}$ of an ounce in 10 lbs. of water, or the 800th part of the entire weight. As a hydrometer of many spindles is expensive and troublesome, and as a single spindle cannot conveniently carry above 100°, this instrument may be said to exhaust the capabilities of such a mode of trial; but, centigrade testing, applied to ammonia, readily discriminates ten degrees of chemical strength between each of the hydrometric degrees.

The following precautions are necessary to be taken in using the ammonia-meter.

1. The instrument must not be warmed by the hand before insertion into the liquor to be tried.—2. The spindle must not be unnecessarily wetted by the liquor: to prevent this, the instrument in a dry state should be put gently into the liquor, and the jar or table be tapped till the hydrometer sinks to the proper level.—3. The lines on the scale are drawn level with the general surface of the liquor under trial, not with the liquor which capillary attraction draws up round the spindle.—4. It must be borne in mind, that when the solution of ammonia has been made with undistilled water, the apparent strength will be less than the real strength, according to the increase of density due to the impurities contained in the water.†—*Quarterly Journal of the Chem. Soc.*

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† The specific gravity of the Thames water at Greenwich is 1.00116 (Bennett, *Chem. Soc. Quar. Jour.* II., 109), and that of London well-water is 1.0007 (Brande, ibid. II. 349.) Liquid ammonia prepared with the former would be 1°, with the latter $\frac{1}{2}$° stronger than the degree indicated by the instrument.

AMMONIA IN ATMOSPHERIC AIR.

Horsford has recently endeavoured to determine the proportion of ammonia in atmospheric air. The air was made to pass through asbestus soaked in muriatic acid, and his apparatus was so contrived that he was enabled to act on 36,000 or 360,000 centimetres of air. One million parts by weight of air gave him the following results:—

Number of the Experiments.	Date.	Ammonia.	CO_2, NH_4O in Parts by Weight.
1	July 3	42.9995	121.4303
2	“ 9	46.1246	130.2787
3	“ 9	47.6308	134.7970
4	Sept. 1—20	29.7457	84.1540
5	Oct. 11	28.2396	79.6356
6	“ 14	25.7919	72.8581
7	“ 30	13.9315	39.1589
8	Nov. 6	8.0953	22.9682
9	“ 10, 12, 13	8.0953	22.9682
10	“ 14, 15, 16	4.7066	13.2726
11	“ 17, & Dec. 5	6.1328	17.2946
12	Dec. 20 & 21	6.9885	19.7077
13	“ 29	1.2171	4.2354

Fresenius found in equal quantities of air in August and September,

By day	0.098 ammonia	0.283 carbonate of ammonia.
By night	0.169 “	0.474 “ “
Mean	0.133 “	0.379 “ “

—*Ann. der Chem. und. Pharm.*, Bd. lxxiv., S. 243.

ON PARAMYLON.

In a green infusory animalcule, *Euglenia Viridis*, found in standing water, Gottlieb has detected a substance which he states to be isomeric with, though distinct from, starch; and to this substance he has given the name of *paramylon.*

This substance consists of green granules, which under the microscope look like very small starch grains. They are, however, not identical with starch, since they do not become blue by the action of iodine. In composition they agree with starch; their formula being $C_{12}\ H_{10}\ O_{10}$.—*Ann. der Chem. u. Pharm.* Bd. lxxv. S. 51.

DETECTION OF DATURIN IN THE URINE.

Runge, in 1824, declared that in cases of poisoning by henbane, belladonna, and stramonium, the active principles of these poisons could be detected in the urine of the patients by its power of dilating the pupil when applied to the eye of another animal. The accuracy of his statements was, however, called in question by Orfila. In 1847 Mr. Allan detected daturin in the urine taken from the bladder of a man who had been poisoned by stramonium. He has subsequently detected it in two other cases of poisoning, that of a man aged forty years, and that of his son aged twelve years. In both cases the daturin was detected by Henry's method.—*Ann. d. Chem. u. Pharm.* Bd. lxxiv. S. 223.

ON SMILAX ASPERA.

BY X. LANDERER.

In the bazaars of the East, particularly at Gallipolis, and in the Misir-bazaars of Constantinople, the stalks without leaves, together with the yellow and black fruits of *Smilax aspera*, are sold for sarsaparilla, and are said to excel the genuine sarsaparilla in efficacy.

ON THE HEALTH OF THE WORKMEN EMPLOYED IN THE MANUFACTURE OF SULPHATE OF QUININE.

BY M. A. CHEVALLIER.

The manufacture of sulphate of quinine, which has been carried on for thirty years in France, occasions with some of the workmen particular diseases, which have not hitherto been studied. Having become acquainted with this fact, I made several investigations on the subject; from which it appears that the workmen employed in this manufacture are subject to attacks of a cutaneous disease, which compels them to suspend their work for a fortnight, or sometimes for a month or longer. Some of them are even compelled to seek other employment.

M. Zimmer, manufacturer of sulphate of quinine, at Frankfort, has found that the workmen employed in powdering the cinchona bark are attacked with a fever which he has designated the *cinchona fever* (China fieber). This malady is sufficiently severe to induce those attacked by it to renounce the occupation and leave the manufactory. This disease has not been observed in France.

At present no means are known for preventing the cutaneous disease. It affects not only the workmen who are employed in the different operations, but it also attacks persons who are merely exposed to the emanations from the factory. The sober and the intemperate are alike subject to it.

It has not been established that causes exist which predispose the workmen to this disease, although some persons consider such to be the case.—*Repertoire de Pharmacie.*

ON SOME PREPARATIONS EXTENSIVELY PRESCRIBED, FOR WHICH THERE EXIST NO RECOGNIZED FORMULÆ.

BY MR. WILLIAM BARRON.

There is now such a variety of preparations in every-day use for which there exist no Pharmacopœia formulæ, that it is a source of much annoyance and inconvenience to the Pharmaceutist. I have been led to this subject at the present time from two recent occurrences in my own shop, and which have forcibly shown me the necessity of some proper understanding amongst us, by which, in the absence of any specific preparation being alluded to by the physician, we may ensure uniformity in the preparation of prescriptions in which these articles are ordered. One of this class most extensively prescribed, is Liquor Taraxaci. Now of this preparation there are a great many kinds in general use:—Squire's, Walduck's, Hooper's, Battley's, and a host of others, varying altogether in taste, effect, and appearance; ranging from a pale, thin, sherry-coloured liquid, almost resembling a tincture, to a thick, syrupy, black-looking compound. Now, if liquor taraxaci is ordered from a wholesale Druggist, a dark-coloured sweetish liquid is generally sent out, and in many instances it is apparently nothing more than a solution of the extract in water, with the addition of spirit, and in ordering from different houses, you have as many different articles, for the reason that, as there is no recognized formula for its preparation, each one is left to his own mode of preparing it. I have always considered the liquor taraxaci, as prepared by Mr. Squire, to be the best and most efficacious, as it appears from a paper of his in one of the early volumes of the Journal; it is prepared without heat, and is, in fact, the expressed juice with the addition of spirit. One of the circumstances I have alluded to as occurring to me, arose from my dispensing a prescription (of a leading London physician) containing ℥iij liq. taraxaci, with Squire's preparation. The customer brought it back the next day, fully convinced some serious blunder had been committed in compounding it, as when he had it made up in London, the mixture was of a much darker colour, and of a very different taste. There is no doubt the prescription had been accurately prepared in both instances, but that different preparations of the taraxacum had been used; and how is a country Druggist to consult the prescriber in a case of this kind?

Essence of Sarsaparilla is another instance, it being made of different degrees of concentration; sometimes ʒj to ʒvij. and often double that strength.

Essence of Senna varies nearly as much, one of our first makers of this class of compounds affirming, that the infusion cannot be concentrated more than one-fourth without deterioration, and other houses generally sending it out at ʒj to ʒvij of the infusion. The same objections extend to the whole of the concentrated infusions when they are prescribed in their concentrated states as liquors, as we see commonly in prescriptions, Liquor Rhei, Liquor Sarsæ, Liquor Gentianæ, &c., and though it may not be of any importance when they are used as concentrated infusions, and diluted each according to their degree of concentration, it becomes most important when they are used in the concentrated state, that they should be of a recognized and definite strength.

The Liquor or Fluid Magnesia, Essence of Camphor, Tincture of Quinine, and many like preparations are equally variable from the same reason. It would be easy to mention many others, but these remarks are only penned in the hope of inducing discussion, and eliciting the opinions of older and more experienced members as to the best and most desirable amongst the many unauthorized formulæ for the preparation of these compounds. In a paper by the Editor of the Pharmaceutical Journal, vol. i., page 455, is the following remark: "Uniformity in the preparation of medicines being the great desideratum, it is obvious that if any improvement in a recognized formula be found desirable, the fact should be made known."

It must needs be doubly important for ensuring uniformity, that when no recognized formula exists, the best and most extensively known should be used.

Cheltenham, Jan. 13, 1851.

SPONTANEOUS DECOMPOSITION OF GUTTA PERCHA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—I beg to call your attention to the two accompanying specimens of gutta percha. One of them is a piece of the first sample which was sent over to this country in its raw state, and which you were then kind enough to give me. The manufactured piece (part of a small hunting-whip), I had sent to me as a curiosity from India a few months earlier. You will perceive that both of them, and particularly the manufactured specimen, are decomposed, and in a crumbling friable state resembling chalk. I am not acquainted with the analysis of the material.

You will, I think, be doing a great service by calling attention to this defect, as the substance is now becoming of such universal use, particularly as a substitute for lead, in pipes, cisterns, &c. I had been half persuaded into the belief that gutta percha pipes and *soft* water were the acme of sanitary reform. Believe me, very faithfully yours,

January 15*th*, 1851. E. F.

[We have mentioned the above circumstance to a manufacturer of gutta percha, who states that he has not met with any similar case of decomposition. The subject requires further investigation.—ED.]

ON KOUSSO.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

SIR,—The variety of remedies that have at different times been proposed for the cure of tape-worm, sufficiently attest their invalidity; and when it is considered to what serious affections the presence of these parasitic animals gives rise, it is incumbent, if only on the score of humanity, to investigate every new proposal made for their eradication from the human frame, and to test in the most unprejudiced manner the means put forth to effect this desirable purpose.

To Dr. Pereira the merit is due of having, in the Pharmaceutical Journal for July, 1850, directed the attention of the medical profession to the anthelmintic properties of the Brayera Anthelmintica, or as it is more commonly known, the *Kousso.*

In Abyssinia, as in other Eastern countries, worms are known to constitute a disease of more frequent occurrence than in Great Britain; and the Kousso has there been used as a remedy for upwards of 200 years; yet it has not been until lately employed elsewhere, and from the extravagant price at which alone it can be obtained in France, there would seem to be little chance of our deriving any satisfactory information on the subject. Desirous of testing the value of the Kousso as a remedy for tape-worm, and having lately received from my correspondent at Aden an ample supply for this purpose, I beg to state through the medium of your publication, that I shall be most happy to present the remedy to the physicians of our medical hospitals and charities, that its qualities may be fairly ascertained previous to my obtaining a larger supply. In Paris I find the Kousso is still held in estimation, and the first trials of it were made in 1847. Few trials have been made in this country; and these are described in the Medical Times, and the Lancet, as having been made by Drs. Todd, Budd, and Gull. It has also been successfully employed by Dr. Inglis, of Halifax.

I am, Sir, your obedient servant,

JOHN SAVORY.

[Mr. Vaughan, the port-surgeon of Aden, has also discovered "kousso" in the bazaar of that place. The sample which he has sent to this country has a slight smell of the goat-skin in which it has come over, but is otherwise of good quality.—ED.]

POISONING BY, AND ADULTERATION OF, THE POWDER OF NUX-VOMICA.

A YOUNG man of the name of William Wren has been committed for trial, charged with attempting to poison a family at Millbrook, near Southampton, on December 26, 1850. The poison, on examination, turned out to be the powder of nux-vomica, which had been introduced into milk. During the examination to which the powder was subjected in order to ascertain its nature, it was found that the nux-vomica powder of which the bulk of the poison was made up, was adulterated with guaiacum-wood dust, which had, doubtless, been introduced at the drug-mill.

In colour and odour, as well as in bitter taste, the powder agreed with nux-vomica. When subjected to microscopic examination, the hairs which are attached to the testa or outer seed-coat of nux-vomica (see Pereira's *Elements of Materia Medica*, vol. ii., part i., p. 1480, fig. 313, 3d. edit., 1851) were very distinct. On the application of nitric acid, the powder, instead of immediately assuming a deep orange-yellow colour (as is the case with pure nux-vomica powder), became bluish-green (owing to the presence of guaiacum), but which soon changed to orange-yellow.

We subjoin the evidence of Mr. Dayman the surgeon, and of Dr. Alfred Taylor:—

Henry Dayman, Esq., examined—I am a surgeon, residing at Millbrook. On Thursday, the 26th of December, I met William Barnes, the constable, in the village of Millbrook, about ten o'clock in the morning. He accompanied me to my house, where I saw William Groves with a blue jug in his hand. They both went into my study with me. The jug contained a fluid resembling milk. I poured the whole contents into a basin. I then re-poured the larger portion from the basin back into the jug, and kept the smaller portion, together with the sedimentary deposit. I poured the deposit and the milk I had retained into an eight-ounce bottle. Barnes and Groves then left, taking with them the jug and that which was poured back into it by us. That same day I separated the sediment from the fluid which was in the eight-ounce bottle. I submitted the sediment to the process of washing, and filtering, and drying. That process occupied me from that day until the 30th of December, on which day I put the powder into an ounce bottle, and the fluid into an eight-ounce bottle. On Tuesday, the 31st, I took both these bottles to London, and delivered them into the hands of Dr. Taylor, at Guy's Hospital. The deposit and the fluid were kept in my possession, under lock and key, from the time that I received them, until I handed them over to Dr. Taylor. On Sunday, the 29th of December, I procured at the shop of Mr. Jeeves, chemist, of East Street, Southampton, a portion of powder, which Mr. Clisby, his assistant, delivered to me as nux-vomica. I delivered that also into the hands of Dr. Taylor.

Alfred Swayne Taylor, Esq., deposed—I am Professor of Chemistry and Medical Jurisprudence at Guy's Hospital. On the morning of Tuesday, the 31st of December, I received from Mr. Dayman an eight-ounce bottle containing milk, and an ounce bottle containing a brown powder, part of which I now produce. I also received from him a small paper packet, labelled "Nux-Vomica." I kept these articles locked up in a private closet until the following morning, January 1st. I then commenced the analysis of the milk. It had the appearance of good milk, as far as quality was concerned, but it had an intensely bitter taste, leaving a hot taste in the mouth and throat. I distilled a portion of the milk, and tested it for prussic acid and other volatile poisons. There were no volatile poisons present. I applied tests to the remaining portion of the milk for mineral poisons, but found none. I allowed the milk to stand forty-eight hours, and then found deposited in it a small quantity of brown sedimentary powder, resembling that which was in the one-ounce bottle. From the strong bitter taste, and the appearance of the powder, I suspected nux-vomica; and on applying tests I found that the milk contained nux-vomica, mixed with the dust of guaiacum wood. There was no poison in the milk except nux-vomica; the guaiacum wood gave the milk the hot taste. I next analysed the powder which had been given me in the ounce bottle. The weight of the powder contained in the bottle, when thoroughly dried, was 52 grains. I tasted this powder, and applied various tests to it. I found it intensely bitter, and rather hot, like the taste of the milk. The chemical tests which I applied to it showed that it was composed, in a great part, of nux-vomica, and the remainder of the dust of guaiacum wood. From 20 grains of it I extracted one-fifth of a grain of that deadly poison—strychnine. That is the essential poisonous ingredient of nux-vomica. It is, therefore, conclusive to my mind that the powder consisted principally of nux-vomica. I then endeavoured to ascertain the proportion which it bore to the guaiacum wood; and from the action of tests upon it, and its taste, I think the proportion of nux-vomica was not less than 65 parts out of 100. The two bottles which Mr. Dayman delivered to me contained altogether 57 grains of a brown powder, of which 37 grains were, in my opinion, nux-vomica, the remainder being guaiacum wood dust. Thirty grains of nux-vomica would be sufficient to cause death. I then proceeded to analyse the powder contained in the paper packet handed to me by Mr. Dayman. I found that it had a bitter taste, and possessed all the chemical properties of the powder contained in the ounce bottle. It consisted of nux-vomica and guaiacum dust. That is an unusual mixture, according to my experience. The adulteration takes place in the drug-grinding, and the chemist has nothing to do with it. The cost of nux-vomica is 26*s.*, and the guaiacum wood about 2*s.* per cwt., the difference being in favour of the drug-grinder.

BLOOMSBURY COUNTY COURT.

ACTION AGAINST A CHEMIST.

This action was brought by Mr. John Perkins, of Skinner Street, Somers Town, against Mr. Henry Walker, of the same street, Chemist, for injury alleged to have resulted to plaintiff from the effects of a box of pills purchased at the shop of the defendant. It is described in the plaint as " An action on *tort*, for that the defendant, by defendant's servant, negligently and improperly caused to be sold and delivered certain drugs, or medicines, to the plaintiff, whereby the plaintiff was greatly injured in his health and constitution, and has sustained damages to the amount of £50 ; the particulars whereof are hereunto annexed :—

	£	*s.*	*d.*
To damages on account of injury sustained by the plaintiff to his health and constitution, and on account of pain induced in consequence of the grievance mentioned in the plaint note	30	10	0
To surgeon's bill for medicines and attendance supplied to plaintiff during his illness caused by said grievance............	10	10	0
To the loss of three weeks' wages during the said illness	6	0	0
To wages paid to a man to act for the plaintiff during his illness, that he might retain his situation	2	5	0
To board, lodging, and wages of a girl employed to wait on plaintiff and his family during such illness	0	15	0
Total......	£50	0	0"

Mr. Dawson (counsel) and Mr. Pritchard (solicitor) conducted the case for the plaintiff. The defendant's counsel was Mr. Parry; solicitor, Mr. Herbert Lloyd, of Milk Street, Cheapside.

Mr. Dawson, before opening the case, requested the Judge to order the witnesses out of Court; Mr. Parry objected, and after some discussion the motion was overruled.

Mr. Perkins (plaintiff) sworn—On Thursday, the 7th of November, being attacked with the gout, I sent to defendant's shop for some aperient medicine. Messenger brought a box containing six pills (the printed directions on the box were, two pills every other night for three nights, afterwards two at bed-time when occasion requires); a verbal message was sent with the pills, viz., that two were to be taken directly, and two at bed-time, and repeated after the interval of a day. I took the two doses as directed, and in the morning was much worse, face swelled, mouth sore, teeth loose. The pills had not acted as an aperient. Had been in the habit of taking aperient medicine for the gout, which usually cured me in two or three days, without taking me from my work. On this occasion I was disabled from work for three weeks. Defendant offered to send a medical man, charging nothing for advice, but supplying the medicine; this I declined. Was unable to eat for several days, was obliged to employ a nurse (at 1*s.* 6*d.* a week and her board) to wait on me. I lost two guineas a week by being disabled from work; nurse about 15*s.*; and Mr. Popham's bill for medical attendance was ten guineas.

Cross-examined—Did not tell the messenger to say the medicine was wanted for gout, but ordered aperient medicine; messenger knew I had the gout. Mr. Popham did not introduce me to the solicitors, Messrs. Pritchard and Co. Had heard that they were very clever. Mr. Popham did not advise me, but told me I could not do better. Cannot recollect who introduced them. Had never had anything to do with any solicitors before.

James French—I am a friend of last witness. Went to Mr. Walker's shop; asked to see Mr. Walker; said I wanted some opening medicine for a person who had the gout. The assistant said he had pills ready prepared, which he recommended, price 6*d.* a box; took half a box and paid 3*d.* Did not observe the printed direction, but asked how they were to be taken; was told, two directly, two at night, omit a night, and take two the next night. I gave the pills to plaintiff and some coffee. He had a hard matter to swallow them; his face was swelled and his neck awry. He was in bed. On Sunday I went to Mr. Walker's, and saw his assistant, who asked if plaintiff was better. I said no, much worse, and described his state. He said the pills were acting on his system. He offered to send a clever medical man who attended at the shop at twelve every morning. It would cost him nothing but the price of the medicines, which he would send him.

Cross-examined—Plaintiff objected. Plaintiff's mouth was not sore when he took the first dose of the pills. I did not mean to say that it was sore at that time. I had got into the Sunday morning statement too soon. I did not give him any pills except the first dose. Made a mistake when I said that he had difficulty in swallowing the pills. Cannot account for the mistake, but am not accustomed to give evidence in Court. It was on Sunday that his face was swelled and he had difficulty in swallowing.

W. H. Popham, surgeon to the parish—I attended plaintiff on the 10th of November. Found him excessively salivated; he gave me two pills, which I analysed, and obtained 1½ grains of calomel from a pill and a half; there might have been more, but I was not very exact as to the quantity. Obtained the calomel by sublimation. Calomel would be injurious for the kind of gout which Mr. Perkins had. It might be useful in some cases where the liver was congested, but not generally. The effects of mercury in excess are very serious, and may last for years. The pills in question would be likely to produce the effects described.

Cross-examined—Cannot recollect in my own practice such a case of salivation occurring unexpectedly. When salivation occurs I check it by proper treatment. I consider calomel not good for gout. Some practitioners recommend it, others not. I am a member of the College of Surgeons. Cannot recollect how long: am sure it is more than four years.* My brother keeps a shop, in which I have an interest, in the same street in which Mr. Walker lives. I am not on bad terms with Mr. Walker, nor on good terms. Mr. Walker has taken a dislike to me on account of a *post-mortem* examination of a child which had died after taking medicine from Mr. Walker's shop. Did not charge Mr. Walker with poisoning the child, but refused to sign the certificate of death. Said the child was affected by opium before I saw the bottle with Mr. Walker's name on it in the room. I do not recollect what was the verdict. I know the attorneys for the prosecution, who are attorneys to the Medical Protection Society. I introduced Mr. Pritchard to the sister of Mr. Perkins : also furnished him with evidence and the names of witnesses. I frequently administer a calomel pill of four or five grains with a black draught. Calomel is composed of one proportion of mercury and one of chlorine. Corrosive sublimate only contains *half a proportional of chlorine* ; it is stronger than calomel. I did not find any scammony in the pills, but cannot swear that there was none. Mr. Parry—Would a pill containing a grain of calomel, a grain and half of scammony, a grain of rhubarb, and some castile soap, act as an aperient ?—I think the quantity of scammony insufficient. At least three grains should be taken. I am not acquainted with a Treatise on Gout by the late Mr. Anthony White. I was not aware that he recommended for the gout a pill similar in composition to the one sold by Mr. Walker (looking at the prescription in the book) ; but that contains aloes, which would carry off the calomel. Mr. Parry—Which is the stronger purgative, aloes or scammony ?—Scammony. I kept a Chemist's shop before I became a medical man. I supplied patent medicines; in that case the Chemist is not responsible for the result; but if he prepares the medicine himself he is.

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* The date is 1847.

Mr. Wilkinson, surgeon—Never saw plaintiff or defendant until now. I keep an open surgery, am a Member of the College of Surgeons, but not a Licentiate of the Hall. I prescribe for the poor, and the medicines are prepared in my surgery by competent assistants. Would not have given such pills as Mr. Walker furnished without seeing the patient. I consider them improper for gout.

Cross-examined—It is common for Chemists to sell aperient and other pills, with which I believe many persons are poisoned. I keep several kinds of pills ready made, and ask questions as to the age, sex, &c., before supplying any medicine. My assistants would prescribe for gout, stating at the same time that the patient ought to be seen.

William Wall called, but not in attendance. This closed the case for the plaintiff.

Mr. Parry appealed to the Judge, asking whether any case had been proved ? He maintained that there was no case for the jury. The Judge admitted that there was certainly no evidence of negligence or carelessness on the part of the defendant. The only question was, whether it be legal for a Chemist to keep such pills ready prepared, and to supply the same, he not being a medical practitioner ? Mr. Parry—That is a point of law. The Judge—The plaintiff may elect between taking a nonsuit, with the option of a new trial, or allowing the case to go to the jury. After some discussion the plaintiff's counsel consented to take a nonsuit. The costs were fixed at £6 17*s.* 5*d.*

MEDICAL SOCIETY OF LONDON.

THE PHYSIOLOGICAL PROPERTIES OF PICROTOXINE.

BY DR. R. MORTIMER GLOVER.

The author commenced by detailing seven experiments, the animals experimented on being dogs, a she-ass, a pigeon, a frog, a rabbit, and a gold-fish. The results in each experiment, and the *post-mortem* appearances, were alike—namely, retrograde movements, shown in a slight degree by convulsive twitches of the eye, head, neck, and shoulders, backwards, and, in an extreme degree, by a regular forced retrogression, salivation, and general tremors, bloody stools, laborious breathing, rapid action of the heart, and opisthotonos. The autopsies revealed total extinction of the muscular irritability, with great heat of the muscular fibres, the thermometer rising to 115 degrees; irritability of heart, more so of the auricles than of the ventricles, both cavities being distended with black fluid blood; the lungs slightly congested; the stomach and intestines showing marks of irritation; great congestion of the brain and its membranes, especially the lower portions, the cerebellum, corpora quadrigemina, and upper part of the spinal cord, with much bloody serum in the ventricles. The dose of picrotoxine given to the dogs varied from one to two scruples; to the ass, 100 grains; to the pigeon, four grains; to the frog, five grains; and to the rabbit, ten grains; five grains were placed in the water containing the gold-fish, but the picrotoxine is very insoluble in water. In all these experiments it was either given by the mouth, or inserted under the skin of the axilla or groin. The author next proceeded to compare the results of his experiments with those made by M. Flourens in the removal of various parts of the brain, especially of the corpora quadrigemina and cerebellum. The resemblance, he remarked, was very striking. To prove this, a quotation was made from Cuvier's report to the Institute, on Flourens' experiments, and the following conclusions were drawn by the author as the legitimate deductions from the results of his experiments: 1. Picrotoxine has the power of determining peculiar movements and effects very similar to those described by M. Flourens as resulting from sections of the cerebellum, and perhaps of the corpora quadrigemina. He did not think, however, that the animals in his experiments were blind until just before death, if then, as in the cases where Flourens cut away the corpora quadrigemina. The iris was certainly in some cases contractile, until the symptoms became very severe, when the pupil was enormously dilated. 2. Picrotoxine also acts powerfully on the spinal cord, and generally is a narcotico-acrid poison. 3. It is not one of those active principles, so very energetic, that is to say, in such small doses, like conia, aconitina, &c., although a most terrible poison. 4. The animal temperature was much increased in some of these experiments, forming in this respect a great contrast with some facts Dr. Glover observed several years ago, showing the great diminution of temperature undergone by animals slowly poisoned by the chloride and bromide of olefiant gas, chloroform, bromoform, &c. How far the increase of temperature was owing to the excitement of the nervous system, he would not decide. The peculiar movements caused by picrotoxine, Dr. Glover thought, were neither reflex nor voluntary, but should be considered a third kind of motion; and he stated, with respect to the *cui bono* of his experiments, that it is our duty to investigate, often without a direct reference to that in the first instance. Everthing that is true generally finds some useful direction. When he, some years ago, called attention to the remarkable physiological properties of chloroform, then scarcely known, who would have supposed it likely to be in such general use?

The discussion which ensued had reference chiefly to the exact nature of the substance denominated by the author "picrotoxine." In the absence of any definite account of its nature and constituents, it was contended that the experiments were by no means so satisfactory as they would otherwise have been. It was argued, however, on the other side, that the experiments were on every occasion so uniform in respect to their results, that it was clear they must be regarded in the light of valuable additions to our knowledge, though Dr. Glover had omitted to give a detailed account of the substance with which he had experimented. He had stated also to the secretary, Dr. Cogswell, that the picrotoxine was prepared by Mr. Morson—a sufficient guarantee of its purity. The discussion afterwards had reference chiefly to the specific effects of the poison, as evidenced by the experiments, but no speaker had had any personal experience in the matter. Towards the close of the debate, the President, in allusion to the very great increase of nervous diseases of late years in England, inquired whether the circumstance might in any way be explained by the fact of the staple beverage, beer, being much adulterated by cocculus Indicus, the plant whence picrotoxine was obtained ?—*Lancet.*

ROYAL INSTITUTION.

The Friday evening meetings were commenced for the ensuing season on the 24th of January, when a crowded audience, comprising a large number of the learned, scientific, and aristocratic patrons of the Institution, were attracted by the announcement of Professor Faraday's intention to explain and illustrate his recent investigations on the magnetic characters and relations of oxygen and nitrogen. We have already referred to this subject in our number for December last, in a slight notice we then gave of the Bakerian lecture, delivered by Mr. Faraday, before the Royal Society, on the 28th of November, but we were unable, on that occasion, to enter into any details.

Mr. Faraday commenced by stating, that three years ago he had observed a marked difference between oxygen and other gases when brought under powerful magnetic influence, and these observations were published at the time. He had found oxygen to be sensibly attracted to the poles of the magnet. The subject had occupied much of his attention since that time, and had acquired increased interest from its apparent connexion with the phenomena of atmospheric magnetism. A French philosopher, M. Becquerel, had also been engaged in the same field of research, and although they had not both pursued the same path, and were not either of them aware of the other's results, yet they had arrived at similar conclusions.

Having explained the difference in the manifestations of the force in different bodies which are described as magnetic, and having referred to the loadstone as affording an instance of one kind of magnetic body, and a piece of soft iron another kind, he represented the magnetism of oxygen as being analogous to the latter; that is to say, it becomes magnetic by induction, but does not permanently retain the properties which are thus developed when the induction has ceased.

To show the magnetic properties of oxygen, a small soap-bubble was blown with oxygen gas by means of a glass tube to which a bladder of oxygen was attached, and the bubble being brought near to the pointed pole of the magnet, was attracted to it. Nitrogen presented no such phenomenon. This experiment was varied by substituting for the soap-bubbles small bubbles of glass, filled with the gases. The two poles of the magnet were connected by means of a piece of soft iron cut into the form of an hour-glass, the points of junction being very small and incapable of carrying the whole of the force, which, therefore, passed through the space surrounding the two cones. This space formed the field of magnetic force in which the effects were developed.

In operating upon the gases enclosed in the glass bubbles, two bubbles of equal size, one containing oxygen and the other nitrogen, were suspended from the ends of a copper wire, one on each side of the point of junction of the conical connecting piece of the magnet, and the wire thus carrying the two bubbles was attached to a slender beam suspended by a few filaments of cocoon silk, with perfect freedom of lateral motion. The two bubbles were thus placed under precisely similar conditions, excepting as regarded the contained gases, and on bringing them under the influence of the magnetic force, the bubble containing oxygen was instantly drawn towards the poles. Mr. Faraday stated that he had estimated the amount of force thus exerted to be equal to the tenth of a grain for one-third of a cubic inch of oxygen, with his magnet. Nitrogen was found to be neither attracted nor repelled, being in this respect similar to a vacuous space.

The influence of heat on the magnetism of magnetic bodies was in the next place illustrated. A piece of iron, on being heated to redness, was shown to be entirely deprived of the property of attraction by a magnet, which property it gradually regained as the temperature was reduced. The magnetism of oxygen was also shown to be similarly affected by heat, while nitrogen remained neutral at all temperatures.

The application of these results for the explanation of variations in the intensity of atmospheric magnetism was reserved for a future communication, to be made on the 11th of April.

NOTICES OF BOOKS.

THE BOOK OF NATURE, *an Elementary Introduction to the Sciences of Physics, Astronomy, Chemistry, Mineralogy, Geology, Botany, Physiology, and Zoology.* By FRIEDRICH SCHOEDLER, Ph. D., Professor of the Natural Sciences at Worms, and formerly Assistant in the Chemical Laboratory of Giessen. Edited from the Fifth German Edition by HENRY MEDLOCK, F.C.S., Senior Assistant in the Royal College of Chemistry.—Part I.—Physics, Astronomy, and Chemistry. John J. Griffin & Co., 53, Baker Street, Portman Square, London; and Richard Griffin & Co., Glasgow. Pp. 267.

THE Germans have ever been foremost in the ranks of those who do not disdain to bestow both pains and learning on the edification and instruction of youth. The *Orbis Sensualium Pictus* of the sixteenth century is a curious example of early illustrated books, and contains a surprisingly large amount of technical information, rendered plain to the youthful student by numerous wood engravings of a graphic and descriptive character. This work was, however, little more than a catalogue, and we only advert to it on account of its presenting a fair index of the beginning of that stream of knowledge which has since flowed to us from that source.

The translated works of Liebig, Kopp, Müller, Gmelin, and Mohr, have tended considerably to enrich the stores of useful information; they are, however, for the most part adapted to the use of those only who have made some progress in the respective branches of science therein treated; there still existed a want of suitable elementary works on most of the subjects illustrated in the Book of Nature, and we therefore gladly welcome the means which supplies that deficiency.

The fact of Schoedler's Book of Nature having already passed through five editions in Germany, renders a critical review of the work almost unnecessary.

The portion of the book devoted to physics occupies 100 pages; astronomy sixty pages; and chemistry 100 pages. It is this last subject which comes more immediately within our province, and we are pleased to find that this branch of science has, equally with its important allies, been treated in a judicious, though we think somewhat too concise a manner. The English editor, whilst preserving the substance of the original, has added much information derived from his own acquaintance with the subject treated, thus enhancing the value of the work and adapting it to the English reader. We hope that when a new edition is called for, each of the various departments will be published separately, and that still more numerous additions will be made to the original text; should, however, the general reader be disappointed at not finding each particular subject as fully developed as he would wish, we would refer him to the modest statement of the author at the conclusion of the treatise on Chemistry:—"Our aim is not to supersede more elaborate chemical works; and to those who study this science for professional, artistic, or manufacturing purposes, or even as amateurs, and wish to become intimately acquainted with chemical changes and chemical laws, we recommend the study of the many excellent works in our own and other languages."

We cordially wish the same success to the Book of Nature in its English dress as has attended its publication in the original, believing it to be a work which few intelligent families will be without, and which the head of every school will find well adapted to form a class-book for his pupils.

THE LONDON AND PROVINCIAL MEDICAL DIRECTORY FOR 1851. John Churchill, Princes Street, Soho. Pp. 606.

THIS is the sixth annual edition of the work. In some of the early editions complaints were made respecting a few accidental inaccuracies, arising chiefly from the inattention of those who neglected to answer the circular of inquiry issued by the editor. By the arrangements now adopted, we believe these defects are removed, and the present is the most accurate record which has appeared. The work is so much in use, that the edition of last year was out of print long before the demand was supplied. It has become as indispensable to those whom it concerns, as the *Court Guide* to the fashionable world.

LITERARY AND SCIENTIFIC REGISTER AND ALMANACK FOR 1851. By J. W. G. GUTCH, M.R.C.S., &c. London: David Bogue, 86, Fleet Street. 12mo. Pp. 212.

THIS is a pocket-book which we have regularly noticed for several years. It sustains the reputation it has hitherto enjoyed, comprising as it does a great amount of information, chiefly scientific, in a very small space. Among the new matter we may notice some practical hints on Photography, articles on Zoology and Botany, and an improved Almanack.

HALF-YEARLY ABSTRACT OF THE MEDICAL SCIENCES. By DR. RANKING. Vol. xii. July—December, 1850. 8vo, pp. 365. John Churchill.

THE LONDON MEDICAL EXAMINER, MONTHLY REVIEW, AND STATISTICAL JOURNAL OF PRACTICAL MEDICINE. No. 10. London: Palmer and Son.

QUEEN'S COLLEGE, CORK.—FACULTY OF MEDICINE, 1850-51. *Introductory Address on Medical Education.* By ALEXANDER FLEMING, M.D., &c. &c. 8vo, pp. 30. Dublin: Hodges and Smith.

THIS address contains excellent advice for students. The author forcibly points out the folly of aiming at a low standard of qualification, under the idea that the diploma examination is the final ordeal. There is a subsequent examination in which the public are the examiners, and those who shirk their studies and trust to the "grinder" for passing the first, may expect to be "plucked" at the second—that is to say, when they commence practice. The same remark applies to pharmaceutical students. The college examination is only the *threshold* by which the student enters the profession; the *end* to which he should aspire is success in after-life, which must chiefly depend on his own proficiency.

TO CORRESPONDENTS.

Anonymous Communications.—We are obliged again to remind our readers that, as a general rule, anonymous communications are inadmissible either for insertion or for reply. A statement which depends for its value on its truth is worthless unless authenticated, by the name, confidentially or otherwise. With regard to anonymous enquirers we make this exception—where the information sought is of a practical nature, or likely to instruct or interest our readers generally, we sometimes waive the objection. But when the question is personal, and the answer would possess no interest except to the enquirer, we cannot occupy our space with such answers. In such cases the names and addresses should be given, and answers would be sent by post.

A Constant Reader (Selby) was not answered for the above reason.

W. H. L. (Hull) should send his name.

G. T. (Birmingham), in a well-written letter, complains of the effects of the depilatory recommended by M. Felix Boudet, which he tried on his chin, and he states that it removed the skin but not the beard, causing him much pain and inconvenience.—[Those who use depilatories ought to be aware that great care is requisite in their application. The object to be attained is the removal of the hair without injury to the skin; but the action of all depilatories depends on their caustic properties, and if applied incautiously, or allowed to remain too long, they destroy both hair and skin. We think M. Boudet's depilatory more safe and better than most preparations of a similar nature, and it may, *in some cases*, supersede the use of the razor, but no depilatory is adapted for the removal of a stiff beard.]

U. X. Y. (Cheltenham).—Liquor taraxaci throws down a deposit which may be removed by decantation or filtering.

A. K. (Ledbury).—The author of the paper is the only person who could answer the question.

A Country Member (Reading).—Barbados aloes having a blackish colour, are not of necessity of bad quality, although the liver colour is preferred. The variable consistence of a mass made according to the same formula most likely depends on the aloes being sometimes not quite dry.

Hierapikra.—One part soccotrine aloes, two parts canella alba.

E. W. (Pontypool).—(1.) Pharm. Journ. vol. viii. No. 11.—(2.) Mr. Griffin, Baker Street.—(3.) It is not yet known.

J. B. (Falmouth).—A patent having been taken out for the manufacture of an article or compound, if any person can prove that he was in the habit of making the same for sale prior to the date of the said patent, the patent is void.

A. Z. (Dover).—Stamp-duty is not charged upon cattle medicines.

Medicus (Nottingham).—(1.) The tincture would not be sensibly injured by straining it through a tin funnel, although, as a general rule, glass or earthenware should be used.—(2.) Tincture of sesquidiloride of iron contains some free acid (see Phillips's Translation of the Pharmacopœia).

A Novice.—(1.) Walker's Electrotype Manipulation.—(2.) Yes.

Minimus.—(1.) An apprentice must pass the examinations before he can be admitted a member.—(2.) Kinovic acid differs from kinic acid. It is obtained from a different species of cinchona.—(3.) Yes.—(4.) There is no test.—(5.) The proposed explanation is probably correct.

R. J. W. O.—(1.) Knotting is composed of red lead and size.—(2.) A good porcelain dish may be used in preparing phosphoric acid, but when the acid is much concentrated it acts on glass and porcelain.—(3.) The quantities should be by weight when not otherwise indicated.—(4 and 5.) No.

A Country Chemist.—The preparation of chloroform has been so amply discussed in this Journal, that further allusion to the subject is unnecessary.

Forceps.—Robinson on the teeth.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Other Communications to the EDITOR (to the care of Mr. CHURCHILL).

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. IX.—MARCH 1st, 1851.

THE COPYRIGHT OF A PHARMACOPŒIA.

It is reported that "King and Queen's College of Physicians of Ireland" has assigned its interest in the Dublin Pharmacopœia to Dr. Apjohn, who has announced his intention of proceeding by injunction against all those who shall copy the work. This threat is levelled against the authors of Dispensatories or other works on Materia Medica, containing the formulæ of the three colleges, placed in juxtaposition for the convenience of the medical practitioner, the dispenser, and the student. We have heard the names of three authors who are already singled out for attack. We understand that in the case of one of these gentlemen (Dr. Neligan), Dr. Apjohn served him with a notice a day or two before the appearance of the third edition of his "*Medicines, their Uses and Mode of Application*," warning him not to commit a "breach of the law," in introducing the alterations or additions of the new Dublin Pharmacopœia.

The question of copyright was formerly raised by the Royal College of Physicians of London, in reference to the London Pharmacopœia, the exclusive publication of which had been entrusted to Mr. Richard Phillips, in lieu of a direct pecuniary consideration for his services in the compilation of the work.

Dr. Collier, in the year 1836, resisted this exclusive right, and contended that the employment of a compiler or editor, not a physician, however qualified he might be as a Chemist, was a violation of the spirit and letter of the charter of the College, and he publicly avowed his determination to defend himself against any injunction which might be brought against him. The College, however, did not deem it expedient to institute proceedings, and Mr. Phillips contented himself with the advantage which priority of publication and the official appointment had given him. We think he acted wisely in retaining the proceeds thus realised, which amounted to a considerable sum, instead of wasting in Law that which he had earned by Physic.

From that time to the present, we have heard nothing of the copyright of the London Pharmacopœia. Several authors have re-published it with notes and commentaries, and it has been amalgamated in numerous works on Materia Medica and Pharmacy, with the Pharmacopœias of the other two colleges. The principle of free trade in Pharmacopœias has therefore been tacitly recognized by the London College of Physicians; and when we consider the class of works which would be affected by the restrictive policy—works of a comprehensive nature, and most important, if not necessary, to the student and the profession—it cannot be doubted that a return to monopoly would be a very unpopular measure; and that the Dublin College would not rise in the public estimation by making such an attempt.

We also doubt the legality of the claim. An individual is protected against piracy by the law of copyright, and the justice of this provision is unquestionable. A society, or public body, issuing publications of a proprietary character, may also in fairness enjoy the same protection. But a Royal College of Physicians, publishing a Pharmacopœia, stands on different ground. The work is issued under the sanction of the Queen in Council for the benefit of the public. The compilation and publication of such a work is one of the duties comprised in the conditions expressed or understood, on which the Charter is held and the Royal sanction enjoyed; and we conceive that from the day that a Pharmacopœia sees the light, it is public property. Such we presume to have been the opinion of the eminent counsel, before whom, it is reported, Dr. Apjohn recently laid a case; for the opinion received was so unfavourable that no further proceedings have been taken by Dr. Apjohn.

THE GREAT EXHIBITION.

FAILURE IN THE EXHIBITION OF DRUGS.

In a former number we announced the public spirited decision of the wholesale druggists of London to lay aside those purely *commercial* considerations which usually reign *on 'Change*, and the rivalry which pervades counting-houses, and to send in a series of specimens representing the state of the drug market, not individually, but as a contribution from the druggists in their collective capacity. In accordance with this decision space was applied for and granted.

With much satisfaction we announced the fact, and in order to facilitate the accomplishment of the undertaking, a pamphlet, containing a list of the various specimens which it was thought desirable to exhibit, arranged in scientific order, was printed, and copies of it were forwarded to the representatives of the trade.

Some indulgence was granted by the executive Committee in regard to the time of sending in specimens which, from their nature, might be injured in appearance by exposure during the internal arrangements of the Exhibition: but the time having arrived at which it was necessary to furnish a correct list of the specimens to be sent in, an intimation was made to this effect. At this late period a difficulty arose, and after further deliberation among the parties concerned, we much regret to state that it was decided to abandon the undertaking.

THE SUPPLY OF MEDICINES TO MERCHANT VESSELS.

We have before us the scale of medicines ordered by the Board of Trade to be provided to merchant vessels, in accordance with the Mercantile Marine Act, which was passed last year. It is issued by the Board of Trade on a sheet, and is also contained in a small book by Mr. Wells, F.R.C.S., with explanatory notes and instructions as to the use of the medicines, and the treatment of various disorders and accidents.

Nothing is more difficult than the task of preparing a general scale of the remedies likely to be required by merchant vessels, sailing under various circumstances to different parts of the world. It is impossible to guard against a deficiency in some instances, without providing a supply which would in others be a great excess. We have, therefore, but little to remark respecting the general selection and quantities ordered. There is, however, this defect, that no allusion is made to the length of the voyage or the climate (with one exception respecting sulphate of quinine), consequently the same provision is to be made for a voyage to Norway, Madeira, or the Cape of Good Hope.

A few inaccuracies appear to have escaped correction in the little book. Some of these are typographical—an oz. being printed instead of lb., &c. In the explanatory notes, adhesive plaster is mentioned, with directions to warm it before application. Macord's isinglass plaster is also alluded to. In the official sheet, oiled silk adhesive plaster is the only kind mentioned. In one place simple ointment (unguentum cetacei?) is ordered, in another simple cerate. Does this mean ceratum simplex P. L.? These are two quite different preparations. We suspect that the term *nitric ether* is intended to imply spiritus etheris nitrici. The pure nitric ether would be unsuitable, especially for a hot climate. Two ounces of sponge for forty men or upwards, would be rather a small allowance, in case of accidents.

There is one clause in the Act which is deserving of especial attention—

> "66. And be it enacted, that any person who sells or supplies any medicines, medicaments, lime, or lemon-juice, of bad quality, for the use of any ship, shall for each offence be liable to a penalty not exceeding twenty pounds."

If this provision is to be strictly enforced, one thing is quite certain—some of those who are in the habit of supplying merchant vessels must either raise their prices, or live upon the loss.

The little book before us, which appears to have a kind of semi-official character, is dedicated to Sir William Burnett, K.C.B., K.C.H., F.R.S. Director-general of the Medical department of the Navy, &c. It contains an Appendix of fourteen pages (small type) devoted exclusively to eulogiums and testimonials on behalf of Sir William Burnett's fluid, the solution of chloride of zinc. This fluid is also noticed and recommended in several other parts of the work, and in the official scale of medicines it is ordered to be supplied to every merchant vessel—for fifteen men and under, fourteen pints; fifteen men and under forty, twenty-eight pints; above forty men, fifty-six pints; and double the quantity in steamers.

The last three paragraphs of the Appendix (like the postscript of a letter) contain the pith and marrow.

> "It is to be hoped that the information to be derived from the above testimonials will meet with the attention it deserves, both from shipowners and masters.
>
> "*Printed directions for using the solution will be supplied with the bottles.*
>
> "Eggs may be preserved for many months by steeping them when fresh in a dilute solution of the chloride of zinc, one part to twenty parts of water. No chemical change takes place within the shell."

Sir William Burnett, in addition to several appointments under government, enjoys the rank of Fellow of the Royal College of Physicians. Having found a goose which lays golden eggs (namely, John Bull), he recommends, for the preservation of the eggs of other people, that which he finds conducive to the multiplication of his own, using his official authority as a lever to enforce his recommendation.

The following is the scale of Medicines and Medical Stores to be kept on board British merchant ships navigating between the United Kingdom and any place out of the same, on and after the 1st of January, 1851. Issued by the Board of Trade under the 7th and 8th Vict., c. 112, s. 18, and the Mercantile Marine Act, 1850, s. 64.

	Quantities required, varying according to the number of Persons on board, viz., for Vessels carrying		
	15 Men and under.	Above 15, but under 40.	Above 40.
Castor Oil	1 lb.	2 lb.	3 lb.
Epsom Salts	4 lb.	8 lb.	12 lb.
Calomel	½ oz.	1 oz.	2 oz.
Powder of Jalap	—	1 oz.	2 oz.
Ditto Rhubarb	—	1 oz.	2 oz.
Senna Leaves	—	2 oz.	3 oz.
Cream of Tartar	6 oz.	8 oz.	16 oz.
Sulphur	8 oz.	12 oz.	16 oz.
Alum	1 oz.	2 oz.	3 oz.
Powdered Ginger	1 oz.	2 oz.	4 oz.
Sulphate of Quinine	½ oz.	1 oz.	2 oz.
Ditto, for Vessels trading to the East or West Coasts of Africa, to the Coast of China and Borneo	3 oz.	4 oz.	4 oz.
Balsam of Copaiba	6 oz.	12 oz.	16 oz.
Calcined Magnesia	4 oz.	6 oz.	12 oz.
Liquid Ammonia	4 oz.	8 oz.	12 oz.
Olive Oil	8 oz.	12 oz.	16 oz.
Spirit of Turpentine	8 oz.	12 oz.	16 oz.
Laudanum	2 oz.	4 oz.	6 oz.
Bicarbonate of Soda	8 oz.	16 oz.	24 oz.
Tartaric Acid	6 oz.	12 oz.	16 oz.
Citric Acid	4 oz.	6 oz.	8 oz.
Nitrate of Silver	¼ oz.	½ oz.	1 oz.
Purging Pills, each to contain of the Compound Extract of Colocynth 4 grs., Calomel 1 gr.	4 doz.	6 doz.	8 doz.
Purging Powders, each to contain of Calomel 2 grs., Compound Powder of Jalap 1 dr.	2 doz.	3 doz.	4 doz.
Opium Pills, each to contain of Opium 1 gr., Castile Soap 4 grs.	2 doz.	3 doz.	3 doz.
Emetic Powders, each to contain Ipecacuanha 1 scruple, Emetic Tartar 2 grs.	2 doz.	3 doz.	3 doz.
Compound Chalk Powder	2 oz.	3 oz.	4 oz.
Dover's Powder	1 oz.	2 oz.	3 oz.
Essence of Peppermint (each ounce to contain 1 drachm of the Oil)	1 oz.	2 oz.	3 oz.
Simple Ointment	8 oz.	16 oz.	24 oz.
Mercurial Ointment	4 oz.	8 oz.	12 oz.
Basilicon Ointment	4 oz.	8 oz.	12 oz.
Blistering Plaister	4 oz.	8 oz.	12 oz.

	Quantities required, varying according to the number of persons on board, viz., for Vessels carrying		
	15 Men and under.	Above 15, but under 40.	Above 40.
Concentrated Chloride of Zinc (Burnett's Solution) (Double the above quantities of Chloride of Zinc to be taken in Steamers.)	14 pts.	28 pints	56 pints
Arrowroot, in Tin cases	2 lb.	4 lb.	6 lb.
Pearl Barley, ditto	4 lb.	8 lb.	12 lb.
Rice, ditto	4 lb.	8 lb.	12 lb.
Mustard, ditto	1 lb.	2 lb.	3 lb.
ARTICLES TO ACCOMPANY THE MEDICINES.			
Set of Scales and Weights	1 No.	1 No.	1 No.
Graduated Drop Measure	1	1	1
Graduated Wine Glass	1	1	1
Pair of Scissors	1	1	1
Syringes	2	2	2
Lancets	2	2	2
Bandages of different sizes	12	12	12
Yards of Calico	6	6	6
Ditto Flannel	6	6	6
Papers of Needles, Pins, and Thread	2	2	2
Tourniquet	1	1	1
Oiled Silk	1 yard	1 yard	1 yard
Oiled Silk Adhesive Plaister	1 yard	2 yards	2 yards
Lint	½ lb.	1 lb.	1 lb.
Sponge	1 oz.	2 oz.	2 oz.
Cotton Wool	2 lb.	3 lb.	4 lb.
Set of Common Splints	1	1	1
Charges of Vaccine Lymph	2	2	2
Trusses (Single), 36 inches in girth	1	1	1
Ditto (Double) ditto	1	1	1
Enema Syringe, with printed Directions for its use	1	1	1
Elastic Catheter, No. 8	1	1	1

In addition to the above, the following Medicines should be supplied to vessels carrying a surgeon, and having upwards of forty persons on board:—

Nitric Ether	2 oz.
Acetate of Lead	2 oz.
Croton Oil	2 drs.
Camphor	1 oz.
Tartar Emetic	1 dr.
Hydriodate of Potass	2 oz.
Ergot of Rye	2 oz.
Tincture of Digitalis	2 oz.
Powder of Ipecacuanha	1 oz.
Sulphate of Zinc	1 oz.

T. H. Farrer,
Secretary.

F. W. Beechy,
W. H. Walker.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, February 12, 1851.

MR. SQUIRE IN THE CHAIR.

DONATIONS TO THE LIBRARY AND MUSEUM.

THE following donations were announced :—

The London University Calendar for 1851, from the University of London.

Six specimens of LICHENS, used in the manufacture of Archill and Cudbear, from Messrs. Wood and Bedford, of Leeds.

Specimens of Cashew Nuts (*Anacardium occidentale*), and of Marking Nuts (*Semicarpus anacardium*), from Mr. William Mansell, South Street, Greenwich.

Specimen of Selenite, from Mr. Gale.

Specimens of Arsenious Acid, illustrating its manufacture.

Specimens of Copper Ore, and of the products of the several processes for obtaining the metal, illustrating the manufacture, from Mr. John Barclay, of the firm of Warner and Barclay.

A large Liebig's Condenser and Stand, from Mr. J. B. French, of Pall Mall.

A CHINESE PILL AND PILL-BOX.

A very interesting specimen of a Chinese proprietary medicine, in the form of a gilded pill, was presented to the Museum of the Society, by Mr. Felix R. Garden, of Oxford Street.

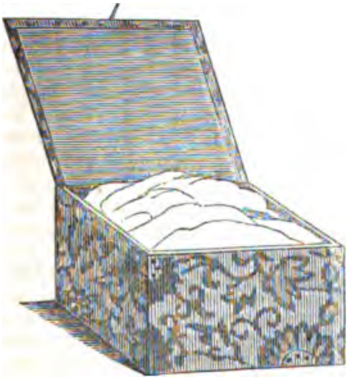

FIG. 1.

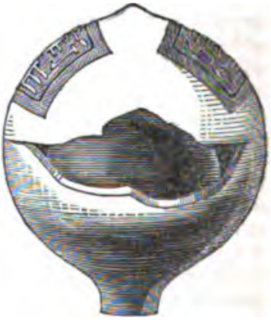

FIG. 2.

Fig. 1 represents the box, one-third the real size. It is covered with figured silk, and originally contained four pills, accompanied by a printed bill descriptive of the virtues of the medicine, and covered with wool. The pill is contained within an outer casing of wax, as shown in Fig. 2, the wax being represented as broken, so that the pill may be seen. The pill is loose in the wax casing, and there is no appearance of there having been any adhesion between them. Fig. 3 is the real size of the pill, and Fig. 2 of its envelope.

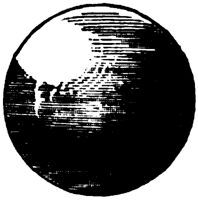

FIG. 3.

ON EXTRACT OF HENBANE.

BY MR. CHARLES CRACKNELL.

I HAVE selected extract of henbane for my subject this evening, not only on account of its being one of the most useful and most powerful extracts prepared from any indigenous plant, but because it elucidates what I am about to state, and exhibits the differences I am about to describe in a more marked degree than any other extract, and consequently requires the greatest amount of care in the preparation of it.

In order to render myself as clearly understood as possible, I shall speak separately of the three most important circumstances to be attended to in the making of the extract.

Firstly.—The selection of the herb.

Secondly.—The expression and evaporation of the juice.

Thirdly.—The result.

First then the selection of the herb—and this is manifestly a very important division of my subject, for a good product is not likely to be obtained from a bad or unfit material—yet, notwithstanding its importance, it is the very thing least attended to. Our Pharmacopœia (I hope soon to have the pleasure of saying our *late* Pharmacopœia) gives a licence for gathering the plant which I cannot but think quite unjustifiable, and which defies at least all uniformity of result, and most writers on the subject confine themselves to the manufacture of the extract. For reasons to be presently stated, I believe that henbane is only in a fit state for extract during a very short period, that is to say, when the flowers at the summits of the plants and its branches are blown, but before they show any symptom of fading. If the plants have been carefully gathered and sent to London, and have not grown amongst high weeds, the leaves will then be green to the bottom of the central stem, the seed vessels and seeds which are formed will be soft and juicy, and the weight of the plant will reside in the leaves and stems: if it be allowed to stand a little longer the lower leaves become more or less yellow—the seed vessels, particularly the lower ones, become hard and prickly—the seeds assume a brownish colour, and on holding the plant by the lower part of the stem, it will be perceived that the weight then resides chiefly in the top. Of the immature plant but little is met with in the market: a description of it is obviously impossible, as I should call it too young at any period before the one first mentioned; the extract yielded by it I shall describe presently. Much has been said at various times about the relative strength of the extracts made from annual and biennial hyoscyamus, and I believe that the opinion is gaining ground that they may be used indiscriminately. It is not my intention to dwell upon this part of the subject now, but I may remark in passing that the physical characters of the two plants and their extracts differ considerably, and in the absence of proof, I have no hesitation in deciding in favour of the biennial—such then is the plant I always use, and to which my present remarks refer.

I now come to the preparation of the extract. The market bundles, which are always more or less heated, should be opened immediately they are received, and the herb spread in a cool place: the leaves, flowers, soft stalks, and seed vessels should then be stripped from the large hard stalks as quickly as possible, ground in a mill (without being sprinkled with water as directed by the Pharmacopœia, as there is already more of that ingredient than the careful operator desires) and the juice expressed, strained through some coarse material, and conveyed to the evaporating pans. I may here remark, that the practised eye can predict the quality and character of the extract by looking at the juice. The juice yielded by the immature plant is of a bright grass green colour; that by the plant of proper age is of a deep dull green colour, such as would be produced by a certain mixture of brown and green; and that by the plant when too old is of a brown colour, with some green colouring-matter floating in it, which speedily settles to the bottom. In a valuable paper read in this room on the 13th of November, the process of evaporation was so ably discussed that little remains to be said on the subject. I believe the best methods, and which are always at command, to be a water-bath, or the passing a current of warm air over the surface of the juice. Among the advantages of this latter process stated by Mr. Archer, there is, however, one with which I beg to differ, he says, "The evaporating liquid requires no stirring, or other attention, from the commencement to the conclusion of the process." Now in practice, I find, that an inferior extract (not of course in strength, but in other qualities which I think very essential) is obtained by leaving the juice to itself to that which results from constantly stirring it; stirring accelerates the evaporation, and produces an extract more convenient for the use of the dispenser, inasmuch as it is less adhesive, and can consequently be weighed in small quantities with much greater facility and dispatch.

I now come to the last division of my subject—the result; the quality of which must, in a great measure, depend on the efficiency with which the two first have been conducted. Strength, doubtless, is one of the most important properties of the extract, but there are other qualities not less important, and which I think should never be sacrificed for obtaining a slight increase of it—such are durability and convenience; and to procuring these in combination with a strength which (although by certain processes it might be exceeded) I have never found equalled in the extracts of commerce, I now wish particularly to draw attention: the most important proceeding for obtaining such a product is the selection of the plant; there is only one time when it will yield it, which is the time already mentioned, and then the albumen and the deliquescent salts of the juice are so nicely balanced, and the product yielded so unexceptionable, that we may fairly look upon it as one of those wise arrangements of Providence which adapts every thing to the use and benefit of man. If the plant be gathered too young, it will yield an extract not only deficient in strength, but possessing neither of the other necessary qualities—it is of a crumbly nature, dries very rapidly, becomes fetid and mouldy, and in a very short time totally unfit for use. If the plant be too old, it will yield an extract, very strong I believe, but void of durability and convenience, for it soon becomes fetid which indicates change, and is very deliquescent which is extremely inconvenient. The same may be said of extracts from which the albumen has been separated, a process which I do not think advisable under any circumstances, for I found the extracts made from the flowering plants of the very rainy season of 1843, keep exceedingly well for one year; some of them I kept more, in fact there is on the table some extract of hemlock which was then put into the same pot in which it now is, and has been purposely kept without being moved or meddled with. It has lost the fine green colour which it once possessed, but on dissolving a few grains in liq. potassæ last evening, and comparing it with a similar solution of last year's extract, I could not perceive any difference in the strength. I believe that if the herbs were well dried and carefully kept for twelve months, they would then yield, by treating with water, an extract much stronger than any that can be made from the green plant, but such extracts do not keep well, and are very deliquescent. Great strength then is not the only requisite of a good extract: it matters little to prescriber or patient whether four or five grains be ordered or taken, but it is very inconvenient to both dispenser and patient to have a box of pills in less than a week becoming soft, and running into a mass, which must be the case unless some dry powder be used in making them, which of course does away with the advantage of the additional strength: it is moreover very important that extracts should be of the same strength at one time of the year as at another, and such they cannot be unless they be made with every precaution to prevent change. Besides the extract of hemlock, already mentioned, there are on the table three samples of extract of henbane, made in the month of June, 1848, 49, and 50, which have been kept in pots merely tied over with brown paper, and have undergone no change worthy of notice, and this is the best proof I can give of the value of the process I have been describing.

107, *Edgware Road*,
8th February, 1851.

Mr. Bell agreed with the author of the paper in considering that the biennial plant yields a better extract than the annual. He believed, however, that the annual plant was very generally used in consequence of its yielding a larger quantity of extract than the biennial.

The Chairman corroborated Mr. Bell's statement, in reference to the relative quantities of extract obtained from the two varieties of henbane. He observed, with reference to the preservation of the extract, that the length of time during which it might be kept depended very much on the extent to which it was exposed to the air. Turning it from one pot to another would cause it to spoil sooner, by exposing a fresh surface.

Mr. Cracknell said he had no doubt that the extract made from the biennial plant was better than that made from the annual, yet some botanists assert that there is no difference in the plants.

ON POTASSIO-TARTRATE OF IRON.

BY MR. WILLIAM BASTICK.

This preparation, first described in the beginning of the seventeenth century, and known to our ancestors under the name of *globuli martiales*, is an unusual instance in chemical experience, where a strict investigation of the nature of a compound has not been co-extensive with its antiquity and its universal use as a therapeutic agent.

Every person conversant with Pharmacy must be acquainted with the Protean forms in which this compound presents itself in commerce, or even when prepared strictly according to the formulæ of the British and Foreign Pharmacopœias, which formulæ are as varied as they are numerous. This diversity of the authorized processes is an ample evidence, especially when referring to a chemical compound, of the little progress that has been made concerning the true character of the potassio-tartrate of iron.

Differing in its physical properties as this salt does when prepared according to each of these formulæ, and, moreover, differing when even prepared by the same formula at every repetition of the process, it cannot be a matter of surprise, when it is stated, that it varies as often in its physical characteristics and its chemical constitution.

It is, doubtless, owing to these irregularities and to the want of a recognized formula to insure its uniform and perfect preparation, that have caused this salt to fall into undeserved disrepute as a remedial agent, and to be supplanted by the ammonio-citrate of iron.

I shall endeavour in this paper to point out the causes of these imperfections, and to show that an elegant salt may be readily and uniformly prepared.

The old method of making tartarized iron by digesting iron-filings with cream of tartar and water, is now become almost obsolete from its well known insufficiency to produce a good result, therefore I shall pass over this process without any further comment, and proceed to consider those formulæ which have been introduced into our Pharmacopœias as great improvements thereon.

The first that demands our attention is that of the London Pharmacopœia, which is as follows:—

> Take of sesquioxide of iron three ounces; hydrochloric acid half-a-pint; solution of potash four pints and a half, or a sufficient quantity; bitartrate of potash eleven ounces and a half; solution of sesquicarbonate of ammonia one pint, or a sufficient quantity; distilled water three gallons.

Mix the sesquioxide of iron with the acid, and digest for two hours in a sand-bath. Add to this two gallons of the water, and set aside for half an hour; then pour off the supernatant liquor. The solution of potash being added, wash what is precipitated frequently with water; whilst moist boil it with the bitartrate of potash previously mixed with a gallon of water. If the liquor be acid when tried with litmus paper, pour into it solution of sesquicarbonate of ammonia until it is saturated. Lastly, strain the liquor, and with a gentle heat let it evaporate, so that the salt may remain dry.

This formula bears evidence on the face of it of being as barbarous as the one it has displaced. According to Mr. Richard Phillips it is a modification of Soubeiran's process; but this modification has so effectually damaged it that no one would recognize it as such were he not informed of the fact.

There is so great a latitude of irregularity introduced into this formula, that supposing the quantities ordered of the ingredients were primarily correct—which they are not—it would be utterly impossible to obtain an uniform result by it. In proof of this assertion it can be shown that the quantity of sesquioxide of iron dissolved by the acid during the two hours digestion will never be twice alike, which fact the authors of the Pharmacopœia seem to be aware of, for they direct the supernatant liquor to be poured off, *i. e.*, poured off the variable quantity of undissolved sesquioxide. This statement is further corroborated by their directions to drop in solution of sesquicarbonate of ammonia until it is saturated, which would not be necessary were sufficient hydrated sesquioxide obtained to neutralize the bitartrate of potash.

But the truth is, if the whole of the sesquioxide of iron ordered were reproduced in this process as hydrated peroxide, the liquid would still be acid, for there is an excess of bitartrate of potash directed to be employed to form a salt neutral to test-paper. The addition of the ammoniacal carbonate does not remedy this evil as regards the ultimate product, because the ammonio-tartrate of potash, which is formed by its addition, is decomposed by the heat necessary to obtain the dry salt, attended with the expulsion of the volatile alkali, and the reformation of the bitartrate of potash.

The reason given for the use of the ammonia salt is to prevent, which it does not entirely accomplish, the mutual decomposition of the peroxide of iron and the bitartrate of potash when digested together, especially if the latter be in excess. But it is surprising that it did not occur to the authorities that this object might be directly and readily accomplished by avoiding the employment of an excess of the bitartrate of potash.

The compound made according to the London Pharmacopœia, therefore, is not alone potassio-tartrate of iron, but a mixture of several salts in ever-varying proportions. These salts are bitartrate of potash, basic potassio-tartrate of the peroxide of iron, tartrate of the protoxide of iron, tartrate of potash, and some other organic combinations.

All the above objections apply equally to the formula of the Edinburgh Pharmacopœia, with one exception, viz., where it directs the hydrated peroxide of iron to be prepared from the sulphate, which is an improvement. The process recommended by Soubeiran is that which is now adopted by most practical men, and deservedly so, for it was the first and principal step in a right direction to produce an eligible compound. In fact, we are chiefly indebted to him for all that is known respecting the real constitution of this salt, and the reactions that take place when peroxide of iron is treated with bitartrate of potash,

The subjoined is Soubeiran's formula for preparing the potassio-tartrate of iron.

> Take of bitartrate of potash, one part; distilled water, six parts; moist hydrated sesquioxide of iron as much as may be sufficient. Digest them at the temperature from 120° to 140° F., until the liquor ceases to dissolve a fresh quantity of the hydrate, then filter and evaporate to dryness by a gentle heat.

Theoretically, this process appears perfect, but nevertheless in practice it is found frequently to fail in producing an uniform result. I find these failures proceed from an imperfection in it common to all the formulæ alluded to, and which it was the intention of Soubeiran to remedy in his process. It arises from the peroxide of iron being under the reducing agency of an excess of bitartrate of potash, during a considerable portion of time necessarily occupied in adding the successive portions of the peroxide, until it is ascertained to have been added in sufficiency.

The new Dublin Pharmacopœia has avoided this difficulty by directing an excess of peroxide to be added at once, consequently this process may be pronounced to be the best of the recognized formulæ, and there is but one objection to it, viz., that there is no necessity whatever for the excess of the peroxide of iron, as a perfect salt may be formed by treating the peroxide of iron with bitartrate of potash in equivalent proportions.

The question now arises, what is the constitution of the potassio-tartrate of iron? It is manifest that this question cannot be answered by analyzing a mixture similar to that produced by the process of the London Pharmacopœia. Therefore, the formula for this salt, as deduced by Mr. Phillips from his analysis, must be discarded altogether, as evidently incorrect, as it was performed on the before-mentioned compound. Moreover, I venture to assert, after repeated attempts, that it is impossible to form a double salt with the constitution of that given by him for the Pharmacopœial salt, viz., $\bar{T}$, KO, $FeO_{1\frac{1}{2}}$.

The reason of this anomaly, for it is an anomaly when we reflect on the constitution of persalts in general, seems to be, that, assuming there is no decomposition of the peroxide of iron, and the bitartrate of potash, whenever there is a mixture of tartaric acid, potash, and peroxide of iron in solution in such proportions, as theoretically, to form a normal persalt, bitartrate of potash is invariably produced, at the expense of a portion of the acid, which would constitute the normal persalt. This explanation admits of demonstration, in consequence of the greater insolubility of the bitartrate of potash in comparison with the basic potassio-tartrate of iron.

Soubeiran and Capitaine deduced from their analyses the formula $\bar{T}$, KO, Fe_2O_3, as a correct representation of the constitution of potassio-tartrate of iron. My results, both analytical and synthetical, perfectly coincide with their view.

Therefore, it would follow that 189 parts of bitartrate of potash and 80 parts of peroxide of iron are the best proportions to form this salt.

The method by which in practice these proportions may be correctly observed I find to be the undermentioned:

Take 278 parts of protosulphate of iron and convert them into a persalt by means of nitric acid. Precipitate the peroxide of iron from this solution by caustic potash; thoroughly wash on a filter the precipitate thus obtained. Introduce into a suitable vessel 189 parts of bitartrate of potash with six times its weight of water; to these add the filter and its contents. The whole is to be digested with a gentle heat, and frequently stirred, until a perfect solution is formed; the filter is then to be removed, and the liquid to be evaporated until it has the consistence of treacle. It may be now spread on well-glazed earthenware, and evaporated to dryness; from which it can separate in thin laminæ. When thus prepared, the basic potassio-tartrate of iron is perfectly and easily soluble in water in all proportions, and closely resembles ammonio-citrate of iron in its appearance and other properties. The annexed table, which shows the proportions of bitartrate of potash to be used with eighty parts of sesquioxide of iron in preparing the potassio-tartrate of iron according to the London, Edinburgh, and Dublin Pharmacopœias respectively, will illustrate what has been already mentioned regarding the misconceptions concerning, and the varied character of, this salt.

Fractional parts are purposely omitted, and the proportions as indicated by my observations are added at the end of the list for comparison:

	F_2O_3		$\overline{T}.KO$
Phar. London.	80	......	306
Phar. Edin.	80	......	283
Phar. Dublin.	80	......	183
	80	......	189

Dr. William Gregory* has suggested that probably a neutral, or more correctly speaking a normal salt, exists of the formula $3\,\overline{T}, 3\,KO, F_2O_3$. He, doubtless, argues the existence of this compound from Knapp having discovered a corresponding antimonial tartrate with potash; but I have failed to obtain a salt with such a constitution, and attribute the failure to the same insurmountable causes as preclude the formation of the salt, as described by Mr. Phillips, to result from following the process of the London Pharmacopœia.

The only analogy between the antimonial series of potassio-tartrates and the ferruginous series is that existing between tartar emetic and the tartarized iron, according to Soubeiran's view of its constitution, unless the existence of Knapp's salt be not confirmed.

In reference to what I have stated concerning the one imperfection of Soubeiran's process, I learn that Mr. Parker, one of Professor Redwood's pupils, has been engaged in a similar investigation to that here recorded respecting that imperfection, and has arrived at a like conclusion as to the reduction of a portion of the peroxide salt to that of a protoxide, by following that process. It appears that this reduction is accompanied by the oxidation of a portion of the tartaric acid, and that formic and carbonic acids are thereby produced. This reaction ensues with other organic acids when treated with many peroxides.

In conducting this investigation, I employed bitartrate of potash prepared by saturating in equivalent proportions crystallized bicarbonate of potash with crystallized tartaric acid, to avoid a source of error arising from the cream of tartar of commerce always containing more or less tartrate of lime. From its insolubility in water this contamination becomes very evident in the manufacture of the basic double salt of iron and potash.

It is curious to observe the inconsistency of the London Pharmacopœia regarding the potassio-tartrate of iron. For while it directs, under this name, a compound to be made which must be necessarily acid to litmus paper, yet it declares in the *Notæ*, that "the solution" (*i. e.*, of this salt) "does not change the colour of litmus or turmeric."

Mr. Mowbray,† when criticising this process of the London Pharmacopœia, first pointed out this inconsistency; but in doing so, he has fallen into graver errors; for he assumes that the potassio-tartrate of iron, made according to Soubeiran's process, is a normal persalt, which would be neutral in its atomic constitution, yet would have an acid reaction on litmus; whereas it is a basic salt, consequently it possesses an alkaline reaction. He also attacks Mr. Phillips because he did not find ammonia in this analysis of the Pharmacopœial salt, forgetting that the ammoniacal tartrate of potash formed in the process is decomposed when subjected to heat, as I have previously mentioned, therefore it was not extraordinary that Mr. Phillips did not find that which had no existence in the dry salt, although it had been employed in the process.

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* *Turner's Chemistry.*

† Vide *Pharmaceutical Journal*, vol. iii., page 891.

A more able and more scrupulous critic than Mr. Mowbray would have paused before he questioned on surmise the accuracy of so skilful and careful an analyst as Mr. Phillips is well known to be.

Mr. **Davenport** said he obtained a good result by the process of the London Pharmacopœia. His practice was to finish the salt off in one day, and to evaporate the solution very carefully. He had sometimes found, when it was allowed to remain until the second day before completing the evaporation, that the product was not so good. He considered it to be a salt of the protoxide of iron, and not of the peroxide, as usually represented. Indeed, its colour, which is more or less of a greenish shade, would seem to indicate that it is a protosalt.

Mr. **Cracknell** had been in the habit of preparing this salt, and he could always, by careful manipulation, obtain a perfectly soluble compound by the process of the Pharmacopœia.

STATEMENT OF THE RELATIVE PRODUCE OF TARAXACUM ROOT AT DIFFERENT PERIODS OF THE YEAR.

Mr. **Jacob Bell** in giving the following statement observed, that it was not the result of experiments made for the purpose, but an average deduction from his laboratory-book during several years. The produce in November had sometimes been quite as great as that in October and December, although on the average it appeared to be less. The general result tended to confirm the opinion of Mr. Squire, stated in an early meeting of the Society, that the best time for making the extract is towards the end of the year, it being generally considered that the quality of the extract is the best when the root is in the greatest perfection, of which the amount of produce affords some criterion.

Produce of extract from 1 cwt. of taraxacum root:—

Jan.	Feb.	March	April	Aug.	Oct.	Nov.	Dec.
8½	6¾	6	5	6	9	8½	9

The **Chairman** enquired whether it had been ascertained what the nature of the soil was from which the roots had been taken, in the several cases referred to in Mr. Bell's paper. He (Mr. Squire) had been accustomed to ascertain this point whenever it was practicable, for he thought it very important to collect exact data of this kind with reference to extracts. Much yet remained to be made out with reference to this class of preparations.

Mr. **Davenport** preferred using the roots which had been grown in a rich and highly cultivated soil.

Mr. **Bell** said he had not ascertained what kind of soil the roots had been taken from; indeed, he should feel little confidence in the accuracy of the representations made by herb-collectors. He could not account for the fact that the proportion of extract obtained from the root was smaller in November than in October or December, as he considered the root in perfection about November, after which time it was liable to deterioration in case of frost.

Dr. **Radcliffe** observed, that it had been found in many instances that the juices of plants take a downward direction in frosty weather, which might to some extent influence the quantity of extract obtained from the juice of the root in frosty weather.

The **Chairman** said, he had noticed that the juice of taraxacum root became more sweet in frosty weather. He considered the root to be in the best state for making extract when there was least of the plant above ground.

Mr. **Cracknell** thought November was the best month for collecting taraxacum root for making extract. The extract made at this period was less deliquescent than that made at other seasons.

ON THE PREPARATION OF VEGETABLE ALKALOIDS.

BY MR. JOHN S. COBB.

I wish to call the attention of this meeting to a peculiar process for the preparation of the vegetable alkaloids. This process, remarkable as well for its simplicity as for the advantage with which it may be applied to the preparation of small quantities of these salts, is based upon the property which charcoal possesses, in common with some other substances, of extracting and retaining certain principles from the liquids with which it is placed in contact. The credit of its application to the above purpose is due to M. Lebourdais. That gentleman had undertaken some experiments in order to demonstrate the pre-existence of the vegetable alkalies in plants, and for that purpose was endeavouring to discover some more direct mode of extracting these salts than the ones commonly employed. Having poured into a phial containing some charcoal an aqueous solution of extract of digitale (previously precipitated by acetate of lead) and shaken the bottle, he was surprised on finding, when the charcoal had subsided, that not only had the liquid become colourless, but also it had entirely lost its bitter taste. It immediately occurred to M. L. that the charcoal, under the influence of some other solvent, would cede again the bitter principle which it had extracted from the liquid. He, therefore, washed and dried the charcoal and treated it with boiling alcohol, which became slightly coloured, and charged with all the bitter principle.

Evaporated in a water-bath this left for residue an amber-coloured liquid, which, by repose and refrigeration, deposited a pulverulent matter. This, separated by filtration, washed, and dissolved in alcohol, gave, by spontaneous evaporation, crystals of digitaline.

Having thus ascertained the practicability of the process in reference to digitaline, M. L. proceeded to test its applicability to the extraction of the alkaloids of other plants, varying somewhat the manipulation according to the substance operated upon.

Thus he obtained scillitine in the same manner as digitaline, while to procure illicine, he boiled a decoction of the leaves of the ilex aquifolium with charcoal, and then washed, dried, and treated as previously the charcoal.

For the preparation of columbine, strychnine, and colocynthine, he operated as follows:—

Having deposited in the lower part of a funnel a layer of well-washed charcoal, he placed the respective substances (previously moistened) upon it, and, by percolation with water, exhausted them of their active principles, which, however, were ceded by the water in passing through the stratum of charcoal. The charcoal was then treated as previously described, and the alcohol yielded, by spontaneous evaporation, crystals of the respective bases.

A remarkable property connected with the three last-mentioned bases is, that by a long-continued stream of water they may be redissolved from out the charcoal which had absorbed them, and this solution being filtered through charcoal, they again combine with the latter substance. M. L. did not find this to be the case with any other of the bases which he examined.

By similar manipulation to the above was obtained an alkaloid which was the subject of an interesting paper from Mr. Bastick at the last meeting, but which, I think, that gentleman is mistaken in supposing to be a *new base*, for so long ago as 1848, M. Lebourdais published an account of arnicina, which he described as "a substance having the aspect and consistence of Venice-turpentine, slightly soluble in water, but the small quantity dissolved communicating to it nevertheless a bitter taste; soluble in all proportions in alcohol; and this solution, by spontaneous evaporation under various circumstances, invariably leaving a residue having the aspect and consistence above described."

In a series of experiments which I made shortly after the publication of M. L.'s process, I found that as a general rule the alkaloids of those substances not containing much colouring matter may be most conveniently prepared by the simple percolation through charcoal, &c.; while those rich in colouring matter require previous precipitation by acetate of lead, excepting of course those substances (as the arnica) whose base is precipitated by this salt. I also found some slight variation of the above process necessary for obtaining certain of the alkaloids in a crystallized form. Thus, in the preparation of atropine, I found it necessary to add a small quantity of water to the alcohol, and to evaporate only till the liquid assumed a milky appearance; with this slight variation, however, I obtained atropine by the above process with comparative facility, though I confess that the quantity was small, ℔j of the root yielding me but about eight grains of the base. This I attribute, however, to not being able to procure the root in a good state of preservation.

I have also obtained rhabarbine by this process, and as, I believe the notices of this substance at present published are rather vague, perhaps I shall not be trespassing too much on your time in giving a short account of it.

It is of a yellow colour, and by the aid of the microscope, is seen to consist of long prismatic crystals: it is fusible at a gentle heat, at a higher temperature in part subliming in the form of a yellow powder, and in part decomposing to a black mass: it is soluble in ether and in boiling alcohol, and insoluble in solutions of the caustic alkalies, which do *not* redden it.

I do not consider the substance obtained by the process to be the rhabarberic acid of Brande's, for that is reddened by the alkalies, and also would appear to be eliminated in the first part of the process, since it is precipitated by acetate of lead; I consider it rather to be the " rhein" of Dulk, which he states to be the real principle of rhubarb, and to become rhabarberic acid by oxidation.

Now, on the supposition that such is the case, it becomes a point of some interest in Pharmacy to determine whether the precipitate occurring in tincture of rhubarb may not be caused by the oxidation of its active principle, and how far the tincture may be deteriorated by such circumstances.

The Chairman, in reference to the allusion made in Mr. Cobb's paper to the elimination of the active principle of rhubarb, said, that a good test for distinguishing Russian from East Indian rhubarb was much wanted, and suggested that probably the process described by Mr. Cobb might be applied for the purpose.

ORIGINAL AND EXTRACTED ARTICLES.

ON THE FLOWER-BUDS OF CALYSACCION LONGIFOLIUM.

BY JONATHAN PEREIRA, M.D., F.R.S.

In the *Pharmaceutical Journal* for January last (vol. x., p. 321) I stated that there had recently been imported into London from India some very fragrant flower-buds, which were called *Nag-kassar*. These buds I thought were those of *Mesua ferrea*, Linn. My opinion was founded on the following facts:—

Nag-kassar.

1st. Their *Guttiferous* structure.

2d. Their name, *Nag-kassar*, which was almost identical with the Indian names (Nagsara, Nagkesar, and Nágacesara) of *Mesua ferrea.*

3d. Their fragrancy, which resembled that of a mixture of violets and roses.

4th. Their sex; most, if not all, the flower-buds were males, and presented the stamens in a very forward state. Now, Roxburgh mentions that the anthers of *Mesua ferrea* are used by the grandees of Ava on account of their fragrancy.

Notwithstanding these points of resemblance between the imported flower-buds and the flower-buds of *Mesua ferrea*, further examination has satisfied me that they are not identical. The large size of the flowers of *Mesua ferrea*, and the smallness of the imported buds, led me to hesitate about their identity; but on reference to the dried East Indian specimens of *Mesua ferrea*, in the collection of the Linnean Society, the difference in size between the imported buds and the buds of Mesua, did not appear to form an insuperable objection to their identity. But the great difficulty was with regard to the calyx, which in Mesua is imbricate, and in the imported buds appeared to be valvate. This probably led an eminent botanist to suggest that the imported buds were those of a *Garcinia.*

I am much indebted to my friends Dr. Wallich and Sir W. Hooker for kindly examining the buds. The latter gentleman sent some of them to Mr. Bentham, who refers them to a guttiferous plant, called by Dr. Wight *Calysaccion longifolium*, and Sir W. Hooker tells me that he has recently received fine flowering specimens of this species from Bombay, and that he has no doubt of their identity.

I subjoin the following account of this plant taken from Dr. Wight's *Illustrations of Indian Botany*, vol. i., p. 130, 1840.

Calysaccion, R. W.

Flowers unisexual. *Male*—sepals (2 ?) intimately united (forming a closed sac) inæstivation. Petals 4, imbricating. Stamens very numerous, sub-monadelphous at the base, filaments short, slender; anthers oblong, 2-celled; cells approximated parallel, opening length-wise, connectivum slightly prolonged and truncated at the apex. Pistil altogether wanting.—*Female ?*

Arboreous, young shoots terete or slightly 4-sided, leaves glabrous, opposite, short petioled, linear-lanceolate, obtuse, thick, hard, and coriaceous, marked with a prominent costa, but without transverse parallel veins. Flowers numerous, congested on lateral tubercles, springing from the axils of fallen leaves (abortive branches) forming dense lateral capitulæ, peduncles short, 1-flowered.

From Mr. Graham's *Catalogue of the Plants growing in Bombay and its Vicinity*, p. 27, 1839, I take the following notice of the species:—

Calysaccion longifolium. Wight *Illust.*, No. 8, p. 130. *Calophyllum Suriga ?* Roxb. *Fl.*, ii., p. 608. Diœcia Polyandria. *Woondy.*—a large tree; leaves opposite oblong; flowers in March and April, in clusters on the thick branches below the leaves; small white, streaked with red, diæceous—the male tree is called *Woondy*—the female *Poonag*—both are also known by the names of *Suringee* and *Gordeoondy.*—Parell and Worlee Hills, Bombay; Kennery jungles in considerable abundance; on the Ghauts, and throughout the Concans. The flowers are collected and exported to Bengal for dyeing silk. The tree is closely allied to Wallich's new genus *Kayea* (*Asiat. Pl. Rar.*, 3, t. 210).

In these notices, no mention is made of the name *Nag-kassar* by which the flower-buds were imported into London, nor of their remarkable fragrance. Roxburgh, however, states that his *Calophyllum Suriga* (which may perhaps be identical with Wight's *Calysaccion longifolium*) are fragrant, and I find the dried flower-buds of Wallich's *Calyophyllum longifolium* in the herbarium of the Linnean Society (4851 in Wallich's collection, and marked "*Certe non hujus generis*") to have the same kind of fragrancy as the imported buds.

The genus *Calysaccion* being nearly allied to *Mesua*, and the flowers of both *C. longifolium* and *Mesua ferrea* having a violet fragrancy, and perhaps agreeing otherwise in properties, may have led to the name of *Nag-kassar* being applied to both.

ON THE CULTIVATION, PREPARATION, AND PROPERTIES OF THE MYRICA CERIFERA, AND M. CAROLINENSIS, OR WAX-TREE OF CAROLINA.

BY W. HAMILTON, M.B.

The genus Myrica is by no means a stranger to our own shores, where one species, the M. Gale, is found growing spontaneously in bogs and marshy situations in various parts both of Scotland and England, where it is vernacularly known by the names of Sweet Gale, Dutch Myrtle, or Sweet Willow. It is a small shrub, rising with many branching stems to the height of about four feet, clothed with soft lanceolate leaves of a light yellowish-green and smooth surface, slightly serrated near their apex, and producing male and female flowers in *amenta*, or catkins, on the sides of the branches of separate plants. The genus Myrica, belonging to the class *Diœcia*, and order *Tetrandria* of Linnæus, and constituting one of the group of *Myricæ* in the natural order of arrangement. The scale of the catkin in the flowers of both sexes is the same, and is shaped somewhat like a crescent. The male flowers have four stamina enclosed within a monopetalous four-cleft corolla. The female, or fertile flowers, consist of a corolla of four minute petals, inclosing two styles, and succeeded by a small one-seeded berry, of which each raceme of catkins furnishes a number, forming a cluster, which appears soon after the flowering, which takes place in July, is over; the berries ripen in the course of the autumn.

The whole of this plant, especially its leaves, flowers, and berries, exhale a strong, fragrant, and somewhat aromatic odour, and possess a bitter taste. Their odour is offensive to most insects, and hence the leaves and twigs are in much request among the poor in the districts in which it is found, for preserving clothes from the depredations of moths, and expelling bugs and other vermin from beds.

An infusion of the leaves is reputed to be anthelmintic and stomachic, and is sometimes substituted for hops in malt liquors, the intoxicating properties of which are said, but I know not with what truth, to be heightened by the addition.

Aiton, in the fifth volume of his enlarged edition of the *Hortus Kewensis*, enumerates seven species of Myrica, besides that which has just been noticed, and which alone is a spontaneous production of our own land. The others are the *Myrica cerifera*, or common candleberry myrtle of North America, which is the one to which I wish more particularly to direct attention, the *M. Carolinensis*, or broad-leaved candleberry myrtle, found chiefly, I believe, in the swampy districts of North Carolina; the *M. Faya*, or Azorian candleberry myrtle, a native of the Azores or Western Islands and Madeira; the *M. Æthiopica*, or African candleberry myrtle; *M. serrata*, or saw-leaved candleberry myrtle; the *M. quercifolia*, or smooth oak-leaved candleberry myrtle, of which there is a variety; β hirsuta, with hirsute leaves; and the *M. cordifolia*, with hearted leaves, the whole of which are found in the southern parts of Africa to the southward of the equinoctial. Of these the first, or *M. cerifera*, appears from Aiton to have been cultivated in this country since the year 1699, or for more than a century and a half, without transgressing the narrow limits of the collections of the curious. It is a small tree with crooked stems, rising to some ten or twelve feet, branching irregularly near the ground, and clothed with lanceolate leaves springing from short footstalks, and destitute of any uniform arrangement. Their upper surface is smooth and shining, and of a bright green compared with their under surface, which is darker; they are sometimes slightly serrated towards their apex as in the sweet gale, but this character is not invariable, even upon the same plant. Seedling plants generally retain their foliage through the greater part of the winter, but, as they advance in age, they shed them earlier and earlier; their odour, when bruised, together with that of the young twigs, is highly fragrant and aromatic. The flowers are whitish, small, and inconspicuous, the scales of the catkin being acute, not lunalated, as in our native species, and those of the fertile plants are succeeded by clusters of small, dry, inconspicuous berries.

The *M. Carolinensis*, which appears to be the more valuable of the two, is a plant of humbler growth, and clothed with broader leaves. These are oblong, attenuated at their base, and coarsely serrated. The scales of the catkin, as in the former species, are acute, and the berries globular.

Both of these species, as well as our own Sweet Gale, admit of easy cultivation, and may be propagated either by seeds or by layers. If by seeds, they should be sown in boxes filled with earth from a rich pasture, broken fine, and placed about an inch beneath the surface: they sometimes remain without germinating till the second year: but their germination might be accelerated by adopting the process recommended by Mr. Lymburn, and published by him shortly before his death in the 14th volume of the *Gardener's Magazine*, from which, for the convenience of those who may not possess that work, I shall transcribe his directions in his own words:—

"Let the seeds to be experimented upon be spread upon a floor, or in a box or saucer, according to the quantity, and thoroughly damped [more or less, according to the nature of the seed, as to its naturally dry or oily condition]; let the whole be well mixed together, so that every seed may receive its proportion of moisture; then add newly slacked lime, in the proportion of from one-eighth to one-tenth of the bulk; and mix the seed again well, so that every seed may receive its proportion of lime; lay it in a heap, and, when it begins to get dry, have it turned, and mixed, and again damped; and continue this process a longer or shorter time, according to the known habits of the seed, as to speediness of vegetation; observing not to let it be long in a dry state, in which the lime will be prejudicial."—*Gard. Mag.*, vol. xiv., p. 75, Jan., 1838.

Mr. Lymburn states that he pursued this plan successfully with seeds of the Spruce Fir [*Pinus Abies*] after having been kept three years out of the cone, and which, under such circumstances, ordinarily refuse to vegetate; but which, under the above treatment, germinated as freely as if they had been fresh; and this after a portion of the same seed, younger by a year, on being damped without the addition of lime, grew mouldy without germinating. Seeds of the Magnolia and other seeds of difficult or tardy germination, under similar treatment, equally succeeded.

The theory of this practice appears to be as follows:—

The lime, nearly in a state of purity, combines rapidly with a portion of the water, which in passing to a solid state in the hydrate of lime, gives out a large portion of its latent caloric, which aids the decomposition of the remainder, and resolves it into its constituent principles, oxygen and hydrogen, thus supplying, in their nascent state, the elements required to convert the less soluble starch of the seed into the more soluble mucilage. At the same time a portion of the liberated oxygen, seizing upon the redundant carbon of the starch, converts it into carbonic acid; which, combining with the hydrate of lime, formed, in the first instance, reduces it to the state of chalk, leaving the other elements of the seed in those nicely balanced proportions which are best adapted to yield nutriment to the infant life of the embryo plant. Air, heat, and moisture, with the absence of light, are the chief requisites to success; and hence the process should be conducted in the shade. The albumen of seeds, which constitutes the food of the plant while yet incapable of extracting it from the soil, consists of the following substances, the elementary principles of which vary in their proportions as below:—

	Carbon.	Oxygen.	Hydrogen.	In all.
Starch or fecula, consisting of	43.51	49.57	6.92	100 parts
Sugar	43.34	49.82	6.84	100 "
Gum or mucilage	42.23	50.84	6.93	100 "

Hence will be understood the nature of the slight alteration of proportions required to convert the almost insoluble fecula of the old albumen into the highly soluble mucilage of the recent and barely ripened seed.

But to return from this, perhaps irrelevant, digression.

If the boxes are set in the shade and the seeds germinate freely, all that will be required for the first summer is to keep the plants free from weeds. During the winter they should be placed under the protection of a warm hedge or wall, where they may enjoy the light and heat of the meridian sun. When of a sufficient size they may be removed to the open ground and planted about a foot asunder. Besides seeds and layers, most of these species may be readily increased by suckers.

Besides the eight species enumerated by Aiton, a ninth, of which little more is known than that its leaves are said to be lanceolate, entire, and destitute of veins, and the berries to attain the magnitude of cherries, is reported to be found in that *terra fera incognita* the islands of Japan, where it is known by the name of Nagi; but no specimens have, I believe, as yet found their way to this country, nor am I aware of our possessing any information as to its commercial, economic, or medicinal properties. Some notice of it may not improbably be found in Kæmpter's *Amœnitates Exoticæ*, or in his *Geschichte und beschreibung von Japan;* of which last an English translation, by J. G. Scheuchzer, in two vols. folio, was published in London in 1728; but neither of which I have the good fortune to possess. It is probable that the Japan species, if it could be obtained, would be found more suited to our climate from the closer correspondence of latitude, and better worth the attention of cultivators. But to return to the Carolina plant.

This has been known in England for about a century and a quarter at least, having been cultivated, according to Aiton, from a period anterior to 1730: whence we may infer that little difficulty would be experienced in procuring plants for cultivation. It has been successfully acclimated in France, where it flourishes luxuriantly in a sandy and blackish turf, requiring little or no care, attaining a stature of from four to six or more feet, and almost annually yielding an abundant crop of berries. It is easily and expeditiously increased by taking off the young suckers which spring up in profusion from the roots of the larger shrubs, and planting them out about three or four feet apart.

The *Myrica Carolinensis* flourishes in light sub-humid soils, and has even been found to thrive upon the sands of Prussia, where, as we are informed by Mr. Charles Louis Cader, in an interesting memoir which he communicated to the *Annales de Chimie*, it was successfully cultivated by M. Sulzer, in his garden, situated on the margin of the Spree, at the distance of half a league from Berlin, in latitude 52° 53′, or 1° 15′ 28″ farther north than the meridian of London [51° 37′ 32″], and where the mean temperature of the year exceeds that of London only by 2° 9′, while the severity of the winter months does not admit a shadow of comparison.

Yet, notwithstanding the enormous reduction of temperature to which it was thus annually exposed, the plants flourished with such vigour in this garden, and their leaves acquired such an amount of aromatic fragrance as to attract the attention of all who visited the garden ; and this fragrance both the leaves and berries retained for a long period, after having been gathered.

From these berries M. Sulzer separated the wax, which retained its fragrance so powerfully after its manufacture into candles, that a single candle on being lighted, not only diffused a delightful odour through the room while burning, but even for a considerable period after its extinction. This indicates the presence of a volatile oil in combination with the wax, whose properties, after being obtained in an isolated form by digestion in alcohol, might be found deserving of investigation.

The successful cultivation of the *Myrica Carolinensis*, so far north as the latitude of Berlin, and in a climate of such rigour for nearly half the year, leads to a strong presumption that it admits of cultivation with equal success and advantage in light sandy soils in the vicinity of Plymouth [lat. 50° 22′], above 2° and 2½° south of Berlin, and in various parts of Cornwall, especially in that open neglected tract adjoining the Lizard [lat. 49° 58′], 24′ farther south, where acres, at present not yielding a shilling of annual rent, might be converted into a source of wealth, hardly exceeded by the mineral riches which slumber beneath the surface. Vast tracts of barren sandy soil in the neighbourhood of Hayle and St. Ives might be converted into smiling plantations of Myrica, perfuming the air with their fragrance, and conferring happiness and prosperity on multitudes at present sunk in poverty and despair.

In America a fertile plant is said to yield annually 7lbs. of berries, from every 4lbs. of which a pound of wax may be obtained. At an interval of four feet between each an acre of ground will contain 2732 plants, which, at an average of only 4lbs. of berries from each, would yield 9928lbs. of berries, producing about 2732lbs. of wax, the value of which those better acquainted with the subject than myself will be able to estimate.

The wax is of a greenish yellow colour, and of a firmer consistence than bees'-wax. Its value for purposes of the chandler may be diminished by the increasing consumption of gas; those, however, who object to that mode of illumination will find a desirable substitute in candles made of this wax, which burn with a white flame without producing smoke, yielding a good light, and not being subject to gutter like those made from tallow: and when quite fresh, they exhale an agreeable balsamic odour while burning, which is reputed, among the inhabitants of Louisiana and the Carolinas, to be eminently conducive to health.

The process by which the wax is separated from the berries is one of extreme simplicity, and consists in throwing them, when collected in sufficient quantity, into a kettle and water poured in to the depth of six inches over them; the whole is then placed over the fire and boiled, stirring the berries during the ebullition, to facilitate the separation of the wax, which forms a pellicle on the surface, when it is skimmed off, and strained through a coarse cloth to free it from impurities. When the wax ceases to rise to the surface, the berries are removed, and their place supplied by a fresh quantity, adding to the original water a quantity sufficient to replace the waste by boiling. The same process is pursued, and after this second batch has been removed, the whole of the water is renewed, and fresh parcels of berries subjected to the operation, until a sufficiency of wax shall have been obtained. When a sufficient mass to form a cake has been thus separated it is spread upon a cloth to drain, after it is dried, melted a second time to purify it, and then formed into cakes of a convenient size for the market.

Besides its application to the manufacture of candles, this wax is found to be superior to tallow for making the finest description of soap, which from possessing a considerable amount of astringency appears better adapted for medicinal purposes than those at present in use.

The variety of uses, however, to which this vegetable wax admits of being applied, remains yet to be determined by experiment; and it is a subject of reproach to the intelligence of the nineteenth century that the value of this produce of a plant, naturalized among us for at least a century and a quarter, should be so comparatively unknown.

The Myrica Carolinensis blossoms, according to Aiton, in the month of May.

Plymouth, January, 1851.

LOBELINA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

DEAR SIR,—I trust you will excuse the liberty I have taken in asking your attention to a matter of no importance to yourself, but in which I feel interested.

In accordance with the custom, I prepared an inaugural essay when about to graduate at the Philadelphia College of Pharmacy, in 1836, which essay was afterwards published in the *American Journal of Pharmacy*, vol. ix., page 98. Since then, feeling an interest in the subject (lobelia inflata), I resumed the investigations then begun—employing the seeds as being much more active than the herbaceous portion of the plant,—and succeeded in bringing them to a more satisfactory state than they were left in in 1836. The latter essay was published in the same Journal, vol. xiii., page 1.

For some reason these essays appear to have been entirely overlooked by the journals and writers on your side of the Atlantic; and now that the drug is attracting the attention of your medical men, its chemical relations are exciting the curiosity of your Pharmaceutists. I should not have taken the trouble to bring their existence to your notice, had I not observed the paper of Mr. Bastick in your Journal for December, in which he states his ignorance of any previous researches having the same tendency as his own. In justice to myself, therefore, I must ask you to insert the article in vol. xiii., at page 1, herewith sent, in your own Pharmaceutical Journal. The essays in question have long been recognized by our own Materia Medica authors; vide *United States Dispensatory*, and other works.

I have, until quite recently, been under the impression that you received the *American Journal of Pharmacy* regularly in exchange for yours, but have some reason now to think that it has not been sent.* As the postal arrangements between our respective countries are now quite favourable, I have directed the printer to mail the numbers to you, *viâ* steamers.

I send you at this time (and herewith) three numbers, viz., vol. ix., No. 2, vol. xiii., No. 1, vol. xxii., No. 4. You will perceive by the latter, that we draw largely on the columns of your own Journal for our selected matter. I receive yours so early by steamers, that it often happens, articles from the French journals are in the hands of our readers before those journals reach our shores.

I have been an attentive observer of the progress of Pharmacy in England since the establishment of the Pharmaceutical Society, so far as it has been exposed in the Pharmaceutical Journal; and I can assure you that its steady advancement has been truly gratifying.

At a recent meeting of the College of Pharmacy, a resolution was passed directing the *Committee on the Cabinets* to take such measures as shall be best calculated to effect an exchange of our own Materia Medica (indigenous) and products with such foreign Pharmaceutical Societies as may be disposed to reciprocate. In the course of the ensuing summer these measures will be commenced here, and should the Committee be as successful as is desirable, we intend sending to your Society the first fruits of their labours.

Trusting you will grant the request above made in reference to my articles, I must conclude by wishing you may long continue to occupy the useful position you now are in, as the advocate of our profession.

Very truly yours,

Philadelphia, January 19*th*, 1851. WILLIAM PROCTER, JUN.

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* We continue to send, as we have done from the commencement of the work, six copies of each number, viz., to the Philadelphia College and Journal of Pharmacy, Dr. Wood, Dr. Hare, Dr. Smith, Wm. Hodgson, jun. The parcel is sent enclosed in the Liverpool monthly parcel of Journals to the local Secretary, Messrs. Evans and Co., addressed to the care of Mr. Frankland, 35, North John Street, Liverpool, to be forwarded to Mr. W. Hodgson, jun., Philadelphia. Until about the beginning of last year, we received the *American Journal of Pharmacy;* since that time it has ceased to arrive.—ED. *Pharm. Journ.*

ON LOBELINA, THE ACTIVE PRINCIPLE OF LOBELIA INFLATA, AND ON SOME OTHER PROXIMATE PRINCIPLES OF THE SEED OF THAT PLANT.

BY MR. WILLIAM PROCTER, JUN.

(From the American *Journal of Pharmacy.*)

In the ninth volume of this Journal (1838) was published an essay on *Lobelia inflata*, by the author of this communication, which embraced a chemical analysis of the plant. According to that analysis, the following named substances were contained in the plant, viz.—*gum, gallic acid, resin and chlorophylle, fixed oil, a peculiar acrid alkaline principle, salts of lime and potassa, oxide of iron and lignin.* It was stated that the active principle of the plant was destroyed or injured by much heat, without determining the cause of the phenomenon, or exposing the peculiar circumstances under which it happened.

This active principle was described as possessing alkaline properties, as capable of forming crystalline salts with acids, and as having a brown colour and semifluid consistence. The sequel will demonstrate the conditions under which this active principle is affected by heat, and the means of rendering it permanent, as well as exhibit a more detailed description of the principle itself.

In volume 5th, page 300 of this Journal, is an essay "*On Lobelia, the active principle of Lobelia Inflata*, by S. Colhoun, M.D.,* Professor of Materia Medica in Jefferson Medical College." At the period that my former essay was written, this paper by Dr. C. was cursorily examined, but the fact that his active principle was *insoluble in ether*, at once caused a belief that the principles were different, and that, that contained in my essay, was unique. A subsequent and more critical examination of Dr. C.'s paper has led to the conclusion that he did not succeed in isolating lobelina, but that his principle was an impure hydrochlorate of that base, as is evident from the following extract from his paper, viz.:—

"The process by which this active principle was obtained, was first by dissolving it in acidulated water; muriatic acid being used for this purpose, the menstruum continued to act on the leaves for seven hours; it was then evaporated, the heat separating the superfluous acid.

"Crystals, on the fluid being sufficiently reduced, were discovered on the bottom of the vessel; they were mixed with some foreign earthy salt, the existence of which was proved by burning the substance remaining after the evaporation, in a small bottle kept for some hours in a red heat.

"To avoid the salts thus formed with the acid, alcohol was used as the solvent; the extract remaining after its evaporation was beautifully transparent, and had the other properties above described. [Alluding to a previous description.] It was this extract that was principally used to form salts with the acids."

From these remarks, it is evident that the substance described as lobelina was really a mixture of the hydrochlorate of that base, with such other matter as alcohol will extract from the watery extract of *Lobelia inflata.* Hence, this *principle* could not have had an *alkaline reaction*, and there is no mention made in the paper of its possessing this reaction. It states that "lobelia [lobelina] *forms salts* with the acids," not that it *neutralizes* acids; and consequently we are led to believe that the salts of Dr. C. were mixtures severally of the acids which gave them names, with the impure hydrochlorate of lobelina.

Speaking of the active principle, the Doctor remarks, "It is very soluble in alcohol; *scarcely, if at all, in ether:* in this respect it differs from nicotine: the active principle of *Lobelia inflata does not even colour ether to which it has been added.*" This declaration is a further evidence that the active principle of Dr. Colhoun was not lobelina, *for of all the solvents of that base, none dissolve it so readily as ether:* and as Dr. C.'s principle was insoluble in that menstruum, it follows that, if lobelina, it must have been combined with an acid, in which state it is much less soluble in ether.

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* An acknowledgment was due Dr. Colhoun for omitting a notice of his paper in the Essay before mentioned. Since the present Essay has been prepared, we lament to state that his death has occurred.

In a work on Materia Medica, by Jonathan Pereira, Professor of Materia Medica, &c., &c., at London, published in 1840, is the following under the head of *Lobelia inflata*, viz.:—

"*Composition.*—No accurate analysis of this plant has hitherto been made. Dr. Colhoun has announced the existence of a peculiar principle in this plant. From some experiments I have recently made on lobelia, I find that it contains *a volatile acrid principle* (oil?), an acid (peculiar?), resin, gum, &c, &c.

"*Vol. Acrid Principle.*—Water distilled from lobelia has the peculiar smell and nauseous acrid taste of the plant. In one experiment I obtained a thin film, of what appeared to be a solid volatile oil. The distilled water is unaffected by acids, sesquichloride of iron, or tincture of galls.

"*An acid* (lobelic acid?).—A decoction of lobelia reddens litmus, and becomes, on the addition of sesquichloride of iron, of a dark olive brown, and in a short time a precipitate is formed (lobeliate of iron). Sulphate of copper gives rise to a green precipitate (lobeliate of copper). Nitrate of silver causes a slight precipitate (lobeliate of silver)."

The object for which the above extracts are inserted is to notice their contents in detail.

1st. Professor Pereira states that he has obtained a *volatile acrid principle* from the *Lobelia inflata*, which he infers to be an oil. By reference to experiments 4th, 5th, and 6th of my former essay on this subject, it will be seen that this point has been fairly tested. A saturated tincture of the leaves of lobelia was distilled, and the product was found to possess the odour, but *not* the acrid taste of the plant. Again, lobelia was subjected to distillation with water, and the distilled liquid returned upon a fresh portion of the plant, but the result was merely an odorous water, without any acrimony, or any taste that could be said to approach it. To place this matter in a clear light, the experiments just mentioned (which were originally intended to prove the presence of a *volatile odorous principle*, but not a *volatile acrid principle*) were repeated; lobelia was distilled and redistilled, but the results have been as above detailed; hence, the inference follows, that some accidental cause must have influenced the product of Professor Pereira.

2d. With regard to "lobelic acid" little can be learned from Professor Pereira's remarks above quoted. By referring to the first page of this article, it will be seen that the acidity of the decoction of lobelia was attributed to gallic acid. From an extended inquiry into the nature of this acid, which will be found in the sequel, it appears to be peculiar to the plant, but very like gallic acid in several of its reactions, which accounts for its having been mistaken for that acid. With these preliminary remarks, which have been made in justice to my own, and to the essays of the gentlemen respectively to whom they apply, the regular matter of this paper will be resumed.

Fixed oil.—One ounce of the seed of *Lobelia inflata*, finely bruised, was macerated in two fluid ounces of sulphuric ether, 54° Baumé, for eight days, with occasional agitation. The ethereal liquor was then decanted, and the seed placed on a displacement filter, and treated with ether until exhausted. This product was mixed with the first, and allowed to evaporate spontaneously. Two drachms and a half of a green fixed oil were thus obtained. Besides this oil, about twenty grains of a brown substance was left after the evaporation of the ether, held in solution by the alcohol contained in the ether. This substance had an extremely acrid taste, owing to its containing a portion of the natural salt of lobelina. The green colour of the oil is due to chlorophylle, derived from minute portions of the leaves of the plant being mixed with the seeds.

A portion of the seed finely bruised was subjected to pressure, surrounded by bibulous paper; and the latter, after the removal of all extraneous matter from its surface, was macerated in ether, which was subsequently evaporated. The oil thus obtained has very little colour, and by exposure becomes limpid. Its specific gravity is .940°. The most prominent quality of this fixed oil is a tendency to the rapid absorption of oxygen, and hence it is one of the drying oils. So much is this the case, that a portion of oil in a shallow capsule became solid in two weeks, and when removed from the vessel had the appearance of gum arabic. A small quantity of white paint was prepared with this oil, and it was found to dry even more rapidly than linseed oil. The seeds contain about thirty per cent. of fixed oil.

Resin.—When a tincture of the seeds made with alcohol 30° B., is evaporated, a brown coloured substance gradually precipitates, which, when dried, has the characters of resin.

Gum.—A decoction of the seed of lobelia is precipitated abundantly by subacetate of lead, but is not affected by solution of iodine, gelatin, or ferrocyanuret of potassium.

Lobelic Acid.—A decoction of the leaves of lobelia is precipitated dark olive brown by sesquichloride and persulphate of iron; green by sulphate of copper; deep brown by nitrate of silver; reddish brown by lime and baryta waters, and is not affected by pure soda or the chloride of calcium or barium. From the peculiar effects of metallic salts on the decoction, Professor Pereira inferred the presence of a peculiar acid, which he designated *lobelic acid*, in case future experiment should prove its claim to the title.

One ounce of lobelia leaves in powder was boiled in half a pint of water for half an hour ; when cold, the decoction was filtered, and sulphate of copper added as long as it caused a precipitate. This was collected on a filter and washed with water until the washings ceased to taste or evince an acid reaction with litmus paper. This precipitate was suspended in water, and a current of hydrosulphuric acid was passed through the mixture, until from a green, its previous colour, it had assumed a uniform deep brown hue, when it was gently heated and filtered. The brown precipitate was principally sulphuret of copper.

The filtered liquor had an acid reaction, and was evaporated carefully to dryness, yielding a dark coloured extract. This was treated with boiling ether, and the ethereal solution allowed to evaporate to dryness spontaneously. A mass of a yellow colour and semi-crystalline texture was obtained, which instantly turned the blue colour of litmus to red when applied to it in a damp state. By treating this product with cold ether and evaporating, the acid is obtained purer and in imperfect crystals. In this state, lobelic acid, when in solution, is precipitated light green by sulphate of copper; olive brown by persulphate of iron; yellow by acetate of lead; yellow by baryta water, and grayish-white by nitrate of mercury. It is not precipitated by chloride of barium.

The action of heat on the active principle of Lobelia inflata.—Six ounces of lobelia seeds, in a bruised state, were macerated in twelve fluid ounces of water, acidulated with two drachms of acetic acid for three days, the infusion pressed out, saturated with magnesia and filtered. This solution had a dark greenish colour, and a very acrid taste. One half of it was put in a capsule on a water-bath, and evaporated to dryness. The extract thus obtained was *entirely without the acrimony* peculiar to lobelia, and which was so strongly manifested by the infusion previous to subjecting it to heat. The other portion of the infusion was treated with ether, and the ethereal liquor separated and permitted to evaporate. The product had a powerful acrid taste and alkaline reaction.

It was observed that the residue in the retort, after distilling water from lobelia seeds, possessed some acrimony; and consideration suggested the idea, that as the active principle was in that case combined with an acid, its presence might exert an influence in preserving the lobelina from decomposition. In accordance with this view, the following experiment was executed :—

Two drachms of bruised lobelia seeds were macerated in two ounces of water, to which five drops of sulphuric acid were added for three days, and filtered. This liquor, which had a light brown colour and acrid taste, was divided into two equal portions, A and B. A was put into a retort, to which a receiver was adapted, and heat applied until three-fifths of the liquor had distilled. On examination of the product and residue, the former had the odour of lobelia, but was tasteless; the latter in the retort was much more acrid than the original infusion, having really *all* the acrimony of the quantity subjected to distillation.

The infusion B was saturated with magnesia, filtered and distilled as before, until three-fifths had passed over. The product resembled that of A. On examining the residue in the retort it was found to have *entirely lost its acrimony.*

To ascertain if lobelina itself, when freed from those substances that necessarily accompany it in an infusion, was similarly affected by heat, one and a half grains of lobelina was dissolved in an ounce and a half of water, and divided into two equal portions, No. 1 and No. 2. No. 1 was subjected to distillation in a distillatory apparatus until one-third of the liquid had passed over. The product and residue were removed and placed in separate bottles. To No. 2 a small portion of sulphuric acid was added, rather more than sufficient to saturate the lobelina, and afterwards subjected to a similar distillatory process, and the residue and product also separately bottled. On examining the results of the distillation of No. 1, the distilled water had a lactescent appearance, which, by standing, assumed a brown colour, and had a bitter taste, but not the slightest acrimony. The residue was opaque, had a brick-red colour, and *none* of the peculiar taste of lobelina, but merely a bitterness. The opacity of the solution No. 1 took place soon after the application of the heat to it.

The product of No. 2 was perfectly *transparent*, and had very little odour or taste. The residue was nearly transparent, and more acrid than the original solution before distillation. It may be well to remark that the lobelina used in this experiment was not entirely pure, owing to the presence of some colouring matter, to which the colour of No. 1 residue may be attributed.

It follows from these remarks:

1st. That an acrid infusion of lobelia may be raised to the boiling temperature without losing its acrimony.

2d. That the condition necessary to bring about this permanence is the presence of an acid, with which the acrid principle will combine.

3d. That the acrid principle in a free state is decomposed by the heat of boiling water, as it is found in neither the residue or the product when a solution of it is distilled.

Lobelina.—Twelve ounces of the seed of *Lobelia inflata*, finely bruised, was macerated in twenty-four fluid ounces of alcohol 28° B., acidulated with half an ounce of acetic acid for three days, and subjected to displacement. This process was continued with dilute alcohol until the seeds were exhausted of their acrimony.

The tincture, amounting to five pints, was evaporated to the consistence of an extract, which weighed an ounce and a half, or one-eighth of the seeds employed. This extract was triturated with an excess of magnesia, and twelve ounces of water gradually added. After frequent agitation for several hours, the liquid was filtered, and the filter washed with water. This solution was then agitated with six ounces of sulphuric ether until all its acrimony was removed. The ethereal solution was then decanted, and allowed to evaporate spontaneously in a porcelain capsule. 18.5 grs. (.0035 per cent.) of a reddish-brown matter of the consistence of honey resulted, which instantly restored the blue colour of litmus, reddened by an acid, and possessed an extremely acrid burning taste.

In this state lobelina contains colouring matter, to deprive it of which it was dissolved in water, and dilute sulphuric acid gradually added until the solution was slightly acid. It was then mixed with purified animal charcoal, boiled, saturated with magnesia, and filtered. This solution was then agitated with ether until the lobelina was removed, and the ethereal solution separated and allowed to evaporate.

As thus obtained, lobelina has a light yellow colour, and somewhat aromatic odour. It is lighter than water,* and when dropped into that fluid rises to its surface, spreads out like a drop of oil, and gradually dissolves without agitation, forming a transparent solution. If the process of purification were repeated there is little doubt but that the lobelina would be obtained perfectly colourless.

Lobelina, in solution, is precipitated instantly as a white bitannate by tannic acid, and is not disturbed at all by gallic acid, corresponding in this particular with the other vegetable alkalies. Its solution forms a white precipitate with nitrate of silver, which becomes deep brown by standing; persulphate of iron does not at first affect the transparency of its solution, but gradually a brown precipitate falls; acetate of lead causes a white precipitate; bichloride of mercury does not produce any change.

When lobelina is placed in contact with concentrated nitric or hydrochloric acids, it is merely dissolved, without undergoing any change, and when diluted the acrimony is found unimpaired; but when acted on by sulphuric acid, it is first blackened, then dissolved, and loses its acrid taste.

Lobelina is soluble in water, but not near as readily as in alcohol and ether. When its alcoholic solution is poured into water the mixture is at first cloudy, but by agitation it gradually becomes transparent. Ether readily removes lobelina from its aqueous solution. Oil of turpentine and oil of sweet almonds also hold it in solution when allowed to remain in contact with it for a short time.

Salts of Lobelina.—A portion of lobelina was dissolved in water, and hydrochloric acid gradually added, until the solution ceased to have an alkaline reaction. The solution was then allowed to evaporate spontaneously, and the *hydrochlorate of lobelina* obtained in four-sided prisms, terminated by pyramids.

The sulphate was obtained in a similar manner by employing sulphuric acid. It crystallizes in acicular crystals radiating from centres, but they were too small to admit of their shape being distinguished correctly.

The *nitrate* also crystallizes in prisms of irregular shape.

The *oxalate* crystallizes in minute silky needles.

The *lobeliate* of lobelina was also obtained in a crystalline form, but the difficulty of isolating the acid in a perfectly pure state prevented the salt from exhibiting perfect crystallization.

The salts of lobelina are more soluble in water than the alkaloid itself. They are also soluble in alcohol and less so in ether. They do not possess any odour, but, when tasted, exhibit all the acrimony of the base.

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* Lobelina was formerly stated to be rather heavier than water, which was owing to the improved state in which it was obtained.

To ascertain if lobelina was really the *active principle*, one-fourth of a grain of that substance in solution was administered to a cat. In less than two minutes it produced violent emesis and much prostration, from which the animal fully recovered in three hours.

Again, one grain of lobelina in one fluid ounce of water was administered directly into the stomach of the animal by an elastic tube. Immediate and total prostration was the consequence, which for half an hour rendered the animal almost motionless—the pupils of the eyes were much dilated. The animal gradually recovered its strength, but the effects of the prostration were evident for fifteen hours afterwards. No emetic or cathartic effects resulted, and the long-continued narcotic action of the substance may be attributed to its remaining in the stomach. Other symptoms of narcotic action were evident, which it is unnecessary to mention. From these remarks, it is evident that lobelina is *not* so active an agent as nicotine.

NEW METHOD OF DETERMINING THE QUANTITY OF OXYGEN CONTAINED IN ATMOSPHERIC AIR.

BY M. LIEBIG.

In the present state of eudiometry, the introduction of a new method of analysis, in addition to those with which MM. Regnault and Bunsen have enriched science, appears, at the first glance, to be a sterile and superfluous task. But these processes are especially adapted for those persons who are accustomed to the delicate manipulations of physics; they require a certain degree of dexterity, and the length of time they occupy in their execution is such that in many cases they are not applicable when it would be most interesting to know the composition of the atmosphere. Thus the application of these methods would be difficult to the physiologist who, in a series of analyses, effected every day for some time, wished to determine the proportions of carbonic acid and oxygen contained in the air; to the mechanic who wished to analyze the gases given off from a furnace; and again to the medical man, who wished to know the composition of the air in the ward of an hospital, or to test the efficacy of some mode of ventilation. It appears to me that a method quite applicable to the purposes I have just mentioned, ought neither to require complicated apparatus, nor any particular dexterity; it should unite, with a certain degree of precision, both simplicity and rapidity in the means of its execution. These conditions are fulfilled in a method consisting in the employment of an alkaline solution of pyrogallic acid, which it is well known quickly absorbs oxygen. If we introduce into a tube filled with mercury, in the first place, some concentrated potash, then a solution of pyrogallic acid, the two liquids combine without any change taking place; but as soon as a bubble of oxygen is introduced, the liquor becomes of a reddish-black or almost black colour, and the oxygen gas is absorbed as quickly as carbonic acid is by potash. The quantity of oxygen absorbed under these circumstances by a portion of pyrogallic acid is very considerable. According to the experiments of Dœbereiner, one gramme of this acid dissolved in an excess of ammonia, absorbs .38 of a gramme, or 260. cubic centimetres of oxygen. This quantity of oxygen is greater than that which is necessary to determine the oxidation of one gramme of sodium, which only rises to 236 cubic centimetres. In an experiment, carefully conducted, I absorbed, by one gramme of pyrogallic acid dissolved in an excess of potash, 189.8 cubic centimetres of oxygen. But one gramme of hydrate of potash (KO HO) absorbs, at 32° Fahr., 192 cubic centimetres of carbonic acid in being converted into neutral carbonate. We thus see that the absorbent power of pyrogallic acid for oxygen, is not less than that of potash for carbonic acid, when this alkali is converted into carbonate of potash.*

The following results, which have been obtained with atmospheric air, give some idea of the degree of precision which may be attained by this method :—

	Volume of Air after the introduction of the Potash.	Diminution of Volume after the introduction of the Pyrogallic Acid.	Volume of Oxygen absorbed from 100 parts of Air.
1.	221.5	46.5	20.97
2.	201	42	20.89
3.	193	40.6	21.03
4.	210	44	20.95
5.	204.5	42.5	20.91
6.	195	40.8	20.91
7.	200	41.8	20.9
8.	200	41.6	20.8
9.	200	41.5	20.7
10.	236	49	20.8
11.	258	54	20.9

Among these determinations, the third has been made by M. Buff, the three last by M. Strecker, and the sixth by M. Faber. The whole of them as may be seen, approach very closely to the best analyses of air, and I have no doubt that by the help of the new method, the greatest accuracy may be attained, provided that a cathetometer be used in the observation of the divisions, which ought always to be done in strict analyses. It is true that in operating with this precision, we lose one of the principal advantages of this method, that of being able, in the space of an hour, to make some half dozen analyses, which in most cases are of sufficient accuracy.

If this method yields us such perfect results, notwithstanding the causes of error which are inherent to it, it is owing to its great simplicity, and to the rapidity with which each analysis may be conducted. It has the advantage of avoiding those errors resulting from changes of temperature and pressure. The influence exercised by the inherent errors of this method on the results is not greater, it appears, than that caused by the inherent errors of any of the most perfect methods hitherto known.

In the analyses we have just given, the operations were conducted in the following manner: The air, the carbonic acid and oxygen of which was required to be absorbed, was measured in graduated tubes of thirty cubic centimetres in size, each cubic centimetre being divided into five parts. After having two-thirds filled the tubes with air, there was then introduced by means of a bent pipette, a quantity amounting to $\frac{1}{40}$th or $\frac{1}{30}$th of a solution of potash, of 1.4 density (1 part hydrate of potash, and 2 parts

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* With the air exhaled by several persons and analyzed, whether by the means of gallic acid or pyrogallic acid, I obtained the following results :—

	Air.	Diminution of Volume after the introduction of Potash.	Diminution of Volume after the introduction of Gallic or Pyrogallic Acids.	Volume of Nitrogen.
1.	220	9	36	175
2.	221.5	9	36.2	175.5
3.	200	11	30	158
4.	164	10.5	29	155

According to these analyses, 100 parts of exhaled air contain—

	1.	2.	3.	4.
Carbonic acid ...	4.09	4.06	8.5	5.30
Oxygen	16.36	16.34	15.0	15.99
Nitrogen	79.54	79.23	79.1	79.90

These analyses have been made solely for the purpose of testing the method, and are of no value in a physiological point of view.

water. By making a few rapid movements of the graduated tube in the mercurial trough, the alkaline solution becomes spread over the surface of the tube, and when the absorption is ended, the diminution of the volume is easily read.

When the air to be analysed is previously dried by means of chloride of calcium, the volume of displaced gas gives the exact proportion of carbonic acid. But, in operating on moist air, the result is erroneous, owing to the absorption of aqueous vapour by the concentrated solution of potash.

When the quantity of carbonic acid is thus ascertained, we introduce into the same tube by means of a second pipette, a solution of one part pyrogallic acid in from five to six parts of water. This solution is added until it is equal in volume to half the volume of the solution of potash. By agitating it a few times, the mixed liquids are spread over the surface of the tube, and when the absorption is completed, the volume of nitrogen may be measured.

When the solution of pyrogallic acid is mixed with the potash, the latter becomes more diluted, and the tension of the aqueous vapour is thus increased. The cause of error, however, which results from this augmentation of tension, is insignificant. Besides, it may be avoided by a very simple process, which consists in introducing into the tube a piece of hydrate of potash of sufficient size to saturate the water introduced with the pyrogallic acid, precisely to the same extent as that of the solution of potash.

In the place of pyrogallic acid, ordinary gallic acid may be employed with the same success. But the use of this acid has this disadvantage, that the absorption, which occupies about two minutes in the case of pyrogallic acid, in this case takes from an hour and a half to two hours. Gallic acid, which is but slightly soluble in cold water, ought to be employed in the state of neutral gallate of potash, used in the state of cold saturated solution. When this liquor is perfectly neutral or contains a slight excess of acid, it remains unaltered by exposure to air; it only acquires the property of absorbing oxygen when combined with an excess of alkali. As soon as the gallic acid mixes with the potash in the tube, the liquor assumes a deep red colour by contact with the gas containing oxygen. Even the thin layers of the liquid become of a blood-red colour, which after some time changes to a brown. We may easily trace the progress of absorption, by observing the colouration of the liquid which moistens the sides of the tube after agitation. The process is ended when the change of colour ceases. As to the absorbing power of gallic acid for oxygen, we know from the experiments of M. Chevreul, that one gramme of gallic acid dissolved in concentrated potash, absorbs 290 cubic centimetres, or nearly .417 of a gramme of oxygen gas. This acid then, in this respect, is not inferior to pyrogallic acid. The following experiments have been made with gallic acid:—

	Volume of Air measured before the introduction of the Potash.	Diminution of Volume after the introduction of the Gallic Acid.	Volume of Oxygen from 100 Volumes of Air.
1.	269.5	55.5	20.6
2.	232	48	20.69
3.	217	45.5	20.89
4.	229	47	20.5
5.	191	40.8	20.85
6.	194.2	40.4	20.80
7.	192.5	40	20.87
8.	244	51.7	21.1

The differences which may be remarked between these determinations are more considerable than those of analyses made by the use of pyrogallic acid. They may be attributed less to the process itself, than to the errors resulting from the change of temperature and pressure. In the two first analyses, as also in the fourth and eighth, the diminution of volume was estimated on the following day, and the figures indicate the rough result without any correction relative to pressure or temperature.

Instead of gallic acid, tannic acid might be employed; but the mixture of tannin and potash absorbs oxygen much more slowly than gallic acid. Pyrogallic acid, which is easily procured, is certainly the best absorbent. With 30 grammes of pyrogallic acid, we may make 150 analyses. Thus the price of this acid is not any obstacle to its use.

In the *Annalen der Chimie und Pharmacie*, vol. xlv., page 1, M. Stenhouse has described an excellent process for the manufacture of pyrogallic acid. By subliming a dry aqueous extract of nut-galls in an apparatus of the same kind as that used for the preparation of benzoic acid, he obtained from 100 parts of the extract, more than 10 parts of pyrogallic acid. When those persons who occupy themselves with photography are convinced that in many cases pyrogallic acid is preferable to gallic acid, it is probable that this new application of it will contribute to improve and render more productive the method of preparation we have just described.

One of the principal disadvantages of the new eudiometric method, consists in the difficulty of correctly reading the volume of gas in the tubes containing mercury, over which there is an aqueous liquid, the adhesion of which to the glass causes the formation of a concave surface. This cause of error may be remedied by always employing the same volumes of air for analysis.

Although this process may in certain cases give results equal to the processes of Messrs. Dumas and Boussingault, Regnault and Reiset, and Bunsen, it is not in any respect destined to replace these.

I must also remark in conclusion, that this eudiometric method is only an application of the observations of Messrs. Chevreul and Dœbereiner on gallic and pyrogallic acids, and that the merit of the discovery itself is due to these learned men.—*Repertoire de Pharmacie.*

RETURN OF THE QUANTITIES OF CERTAIN DRUGS AND MERCHANDIZE IMPORTED, CONSUMED, & EXPORTED

During the last Twenty-five Years.

We intend to furnish our readers with a series of tables showing the quantities imported, exported, and retained for home consumption, of about a hundred of the principal drugs, &c. during the quarter of a century just expired.

We shall also give a table showing the prices of these drugs during the same period of time, the prices being taken at four different parts of the year, and the average deduced therefrom. We shall give the rates of duty charged on the various drugs. In the case of imports we shall also indicate the respective countries whence our chief supplies of the various drugs are obtained, and in the case of exports enumerate who are our best customers for these articles.

In the return for 1850 some of the quantities have not yet been obtained, but we hope to supply the deficiency next month.

The repeal of the duties on several articles in 1844 cut off the source of information as to some of the quantities.

	ARROW ROOT.			ASHES, PEARL AND POT.			BORACIC ACID.			BORAX.			CARAWAY SEED.			CASSIA LIGN.		
	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.
	lbs.	lbs.	lbs.	cwts.	cwts.	cwts.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	cwts.	cwts.	cwts.	lbs.	lbs.	lbs.
1826	318,830	358,007	6,145	217,268	203,105	16,272	3	3	—	293,149	107,323	83,797	241	182	34	533,948	43,182	347,784
1827	393,599	317,830	4,102	135,559	127,166	21,583	1,646	30,983	250	51,623	213,359	68,866	389	569	111	415,702	42,984	427,695
1828	451,440	391,118	9,418	155,618	148,808	17,369	196,454	149,702	—	52,837	174,987	125,491	654	458	61	549,535	55,787	356,320
1829	556,493	479,047	21,295	162,259	143,657	19,780	157,885	154,486	—	153,271	136,855	131,749	773	632	48	817,968	62,252	795,242
1830	449,723	516,587	25,333	233,908	215,777	6,443	439,944	316,932	—	172,642	121,088	134,314	5,665	2,889	31	837,589	65,705	767,642
1831	297,429	329,036	61,732	228,756	192,046	23,469	260,193	310,166	782	188,537	196,766	30,981	2,855	3,510	91	398,420	61,162	718,772
1832	386,301	392,633	9,333	191,911	184,908	19,356	547,609	618,304	—	169,682	111,489	69,341	993	2,675	257	1,046,556	72,339	764,060
1833	501,170	487,359	36,225	169,728	166,422	11,395	767,767	775,140	—	109,713	76,062	65,840	1,765	1,367	33	1,297,710	77,067	1,341,546
1834	837,811	735,190	24,866	94,134	89,960	6,136	747,499	693,021	18,682	235,665	89,960	59,820	7,640	4,230	620	2,066,836	100,182	1,680,350
1835	987,966	895,406	29,837	134,315	129,961	9,987	792,507	825,185	36,409	335,224	129,961	60,539	643	2,200	578	1,966,303	98,313	1,432,035
1836	691,572	618,968	30,270	155,955	130,176	19,137	1,236,328	1,101,405	11,532	392,874	344,220	52,356	408	459	403	837,413	89,396	633,083
1837	474,257	488,540	62,541	147,328	128,098	18,810	991,004	825,312	5,378	743,607	398,867	58,028	274	351	40	984,674	105,485	760,141
1838	404,738	434,574	28,613	127,101	122,390	5,097	951,553	921,164	60,382	370,059	371,060	63,279	107	210	154	380,655	100,837	557,702
1839	362,593	375,812	52,860	112,687	105,719	8,861	1,359,103	1,243,868	21,150	780,164	498,079	73,717	1,595	914	210	435,716	106,388	656,984
1840	378,202	361,939	15,390	99,295	87,728	15,266	1,240,376	524,205	—	575,890	319,126	114,740	587	585	274	329,310	74,050	644,520
1841	694,678	547,848	15,820	91,844	78,034	13,296	944,376	1,702,979	128,012	432,883	209,088	303,085	259	494	434	1,261,248	83,034	1,262,164
1842	890,736	846,832	37,408	122,518	106,513	15,808	821,296	811,840	112	401,072	87,248	272,720	4,258	3,119	76	1,312,804	119,470	1,247,496
1843	1,033,312	951,888	29,568	146,951	145,081	5,158	1,678,432	1,536,192	2,464	94,864	99,568	329,280	5,859	4,310	142	2,470,502	134,399	1,986,413
1844	1,150,688	1,122,016	22,400	164,485	162,087	700	1,686,720	1,786,736	69,440	159,824	39,088	407,344	7,049	7,594	426	1,278,413	112,128	1,403,313
1845	1,060,640	1,060,752	43,456	181,574	—	2,919	1,542,080	—	51,968	309,344	—	159,040	3,379	3,403	323	1,422,236	149,843	1,156,265
1846	905,072	981,120	21,616	138,349	—	672	1,489,152	—	38,304	375,760	—	230,832	9,184	8,283	210	995,490	137,855	950,255
1847	1,185,968	1,211,168	20,272	102,548	—	3,684	2,487,520	—	36,512	75,264	—	349,664	3,643	4,210	253	342,693	113,835	543,755
1848	906,304	933,744	25,312	96,859	—	15,330	2,711,408	—	29,792	766,416	—	250,544	7,266	5,663	305	510,247	74,999	259,193
1849	1,036,224	1,032,976	36,736	158,385	—	2,726	1,694,112	—	24,968	444,192	—	334,544	7,075	5,544	413	472,693	82,551	525,798
1850				184,043	—			—			—					988,017	97,539	753,915

	CASTOR OIL.			CINNAMON.			CLOVES.			COCHINEAL.			GINGER.			GUM ARABIC.		
	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	cwts.	cwts.	cwts.	cwts	cwts.	cwts.
1826	263,382	453,072	29.847	156,485	14,155	344,404	280,350	52,701	75,247	195,165	94,426	76,911	20,417	13,405	2,815	18,974	7,473	6,291
1827	156,298	117,764	13,215	1,267,444	14,451	359,692	253,009	85,990	27,812	320,722	171,325	145,756	12.253	12,383	6,504	11,695	15,209	2,582
1828	217,173	255,481	13,890	337,483	15,696	354,536	484,368	61,216	152,687	258,032	147,819	158,109	14,600	7,374	6,930	5,211	18,167	1,507
1829	396,104	293,029	37,310	514,225	29,720	386,108	36,071	48,638	57,904	288,456	127,954	153,738	11,007	5,947	11,209	8,233	17,250	2,049
1830	490,558	334,497	31,770	464,175	nil.	535,223	158,006	60,111	39,576	316,589	182,217	100,059	5,491	6,284	4,575	7,785	14,002	1,070
1831	393,191	327,940	62,795	225,969	23,172	504,643	128,233	83,885	81,912	224,371	134,222	168,329	5,315	4,828	6,092	7,285	9,470	280
1832	301,636	477,449	33,117	36,762	15,272	524,277	251,493	82,672	83,752	388,478	166,900	138,270	8,568	6,138	3,819	8,700	7,173	372
1833	343,802	361,386	26,246	102,402	11,073	447,855	265,414	65,455	144,767	358,734	178,246	130,732	16,206	7,612	5,871	15,184	12,078	358
1834	694,371	546,436	37,033	221,222	11,686	222,493	150,184	86,488	53,400	410,387	139,860	265,490	20,031	11,382	10,977	17,424	17,613	819
1835	1,109,307	670,205	61,296	445,367	16,604	413,138	124,924	93,246	301,554	418,320	162,596	352,023	12,954	10,514	3,536	13,981	15,309	4,545
1836	981,585	809,559	68,515	616,746	17,038	421.497	25,885	117,159	126,323	673,094	167,316	435,534	26,217	9,676	5,345	24,411	18,160	809
1837	958,273	729,326	95,191	1,039,346	14,856	557,545	185,127	86,046	153,066	492,324	153,975	362,922	35,620	13,562	11,004	18,646	12,900	2,653
1838	840,301	620,594	135,860	404,604	16,652	507,529	182,210	107,772	125,487	615,483	195,715	334,353	40,276	11,612	17,055	24,191	16,420	2,524
1839	918,604	710,344	318,572	529,867	16,343	434,986	367,531	102,036	65,704	1,027,649	396,902	518,125	39,582	8,929	19.851	25,289	16,086	6,771
1840	1,195,874	807,175	408,391	294,638	15,461	464,340	59,710	85,769	207,310	1,105,554	325,744	819,329	16.004	10,622	11,061	18,036	17,554	4,859
1841	871,136	732,720	360,578	418,730	15,410	514,479	71,223	78,333	26,745	1,120,655	380,314	873,064	10,839	7,282	5,442	21,260	18,756	3,804
1842	613,088	425,152	199,360	223,166	16,658	368,554	32,421	90,313	54,556	1,318,912	475,104	603,680	10,257	8,234	6,844	22 079	17,978	4,436
1843	1,051,792	773,248	218,848	406,387	16.706	422,505	120,874	99,943	26,504	1,127,728	637,392	628,544	9,664	10.401	7,941	18,837	20,031	6,341
1844	1,223,264	1,323,392	207,984	951,220	18.462	661,634	263,178	128,319	70,003	1,163,120	564,816	810,320	13,356	14,786	3,124	21,893	17,606	7,118
1845	1,801,632	—	379,792	636,759	23,143	588.309	414,486	112,078	344,533	1,091,776	—	557,648	24,370	15,937	5,712	38,513	—	10,053
1846	1,477,168	—	343,392	408,603	23,465	435,971	100.812	133,064	112,002	1,285,984	—	817,936	20,010	15,163	9,069	27,954	—	13,458
1847	451,584	—	127,008	383,642	17,503	416.698	1,041,171	133,055	588,536	1,637,216	—	1,001,840	12,995	9,744	6,974	27,056	—	9,766
1848	513,856	—	289,184	347,368	32,345	511,868	117,433	126,691	178,259	2,058,560	—	1,311,296	13,748	10,454	9,091	24,022	—	5,148
1849	1,084,272	—	292,544	759,088	61,933	623,935	274,713	133,717	98,219	2,044,448	—	1,588,048	28,015	12,880	12,021	33,136	—	10,218
1850		—		700,001	28,448	610,495	749,625	159,955	215,342	2,514,512	—	1,104,208					—	

	GUM TRAGACANTH.			MACE.			NUTMEGS.			OLIVE OIL.			OPIUM.			PEPPER.		
	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported	Imported.	Retained for Home Consumption.	Exported.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	galls.	galls.	galls.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs
1826	27,196	10,348	201	118,975	15,600	51,079	338,702	101,117	79,579	724,719	850,982	235,710	79,829	28,329	49,776	14,091,799	2,529,027	5,329,525
1827	6,682	21,030	919	23,133	16,760	31,768	74,854	125,529	35,389	1,028,174	1,070,765	132,680	113,140	17,322	87,333	9,083,605	1,949,931	4,092,386
1828	24,473	24,823	613	42,134	16,094	37,783	58,685	140,002	32,518	2,336,001	1,753,338	117,965	84,186	20,680	95,739	4,987,630	1,927,718	4,226,031
1829	30,908	24,536	2,197	6,841	14,254	20,106	38,868	113,273	47,913	1,153,835	1,334,759	187,501	48,634	23,970	41,919	2,015,184	1,933,641	2,962,063
1830	26,449	28,165	599	15,789	12,600	14,596	247,912	121,260	163,045	2,791,057	2,147,876	221,028	209,076	22,668	170,080	2,816,598	2,009,154	1,488,238
1831	60,442	38,300	2,711	41,287	18,894	63,795	210,363	152,369	88,352	4,158,917	1,928,892	672,852	9,967	25,937	25,045	6,273,480	2,050,082	6,844,616
1832	44,699	53,372	4,510	72,538	15,938	60,763	224,427	117,405	146,780	110,822	1,284,180	819,595	68,378	30,258	19,562	4,088,847	2,225,491	3,657,378
1833	85,033	58,827	1,632	20,390	15,014	10,564	119,050	92,954	96,195	1,891,918	1,368,217	397,367	106,846	35,407	53,001	8,729,552	2,228,393	3,997,027
1834	31,166	34,227	5,169	27,772	17,184	6,677	242,091	119,228	175,640	2,318,142	2,225,227	234,930	48,216	28,467	31,604	7,675,340	2,457,020	6,391,247
1835	34,487	30,430	28,592	20,641	18,673	17,210	435,047	129,880	194,997	606,166	554,196	283,734	85,481	31,181	74,126	3,343,277	2,359,573	1,246,482
1836	100,316	43,511	7,483	84,255	22,531	25,322	335,456	115,763	180,338	2,682,016	1,844,022	150,561	130,794	38,943	70,824	7,724,932	2,794,491	4,151,569
1837	109,337	63,880	6,372	38,086	18,469	8,300	317,284	134,039	151,148	1,721,914	1,496,656	209,472	79,651	37,487	67,476	5,291,993	2,625,075	4,768,860
1838	78,537	66,886	8,438	25,902	20,392	7,228	239,080	125,310	123,297	2,009,110	2,026,146	200,763	95,832	30,435	13,028	3,682,342	2,631,266	3,077,109
1839	20,847	13,921	19,921	27,007	21,154	4,073	282,302	133,470	107,813	1,793,920	1,806,178	166,948	196,247	41,632	10,193	9,798,059	2,636,110	8,334,226
1840	35,687	34,649	10,457	21,403	16,813	17,373	113,193	118,554	51,244	2,213,436	1,985,902	130,887	77,872	46,736	35,848	5,927,959	2,740,696	5,049,428
1841	43,683	24,222	22,829	18,774	16,280	2,802	135,198	113,147	78,388	1,193,000	1,335,788	159.149	155,609	39,074	61,104	15,034,466	2,746,061	6,373,145
1842	8,736	24,864	4,592	13,770	18,984	2,688	169,211	170,010	85,174	3,551,940	2,399,544	175,392	72,373	47,432	126,515	6,021,290	2,679,848	5,573,820
1843	42,896	47,152	224	28,113	20,348	9,701	209,602	167,936	36,365	3,047,688	2,516,724	100,548	250,086	32,051	320,947	4,083,160	2,738,421	2,651,650
1844	108,864	109,312	2,240	33,898	22,655	19,795	152,110	108,943	27,514	3,770,424	2,675,988	95,256	248,340	32,609	196,871	8,087,099	3,094,891	4,040,851
1845	101,360	—	4,144	35,551	17,380	28,004	444,706	121,131	162,923	3,103,380	—	76,356	259,644	38,229	238,243	9,852,984	3,209,718	7,274,350
1846	35,616	—	8,288	83,104	18,978	37,152	405,679	227,321	182,187	2,150,568	—	161,280	103,078	34,737	113,375	5,906,586	3,299,955	2,874,520
1847	44,800	—	26,544	60,265	18,821	22,119	367,936	150,657	245,004	2,190,384	—	169,596	110,132	45,260	68,521	4,669,930	2,966,022	2,930,018
1848	26,208	—	9,184	47,572	19,712	28,064	336,420	167,143	166,266	2,541,672	—	229,320	200,019	61,055	79,205	8,125,545	3,185,337	4,385,030
1849	35,168	—	26,680	45,978	20,605	32,604	224,021	178,417	91,433	4,274,928	—	122.472	105,724	44,177	113,154	4,796,042	3,257,911	4,712,431
1850		—		76,365	21,997	46,438	312,418	168,402	151,526	5,237,316	—	94,500	126,318	42,334	87,451	8,082,518	3,174,425	3,727,183

	QUICKSILVER.			RHUBARB.			SAGO.			SALTPETRE AND NITRATE OF SODA.			SULPHUR.			WAX (BEES').		
	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Ex-ported.	Im-ported.	Retained for Hom Consum p tion.	Ex porte
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.	cwts.
1826	191,420	205,880	472,948	102,624	32,936	63,058	9,644	2,565	769	131,170	122,063	52,300	251,981	238,093	6.817	4,130	3,562	1,493
1827	883,261	199,092	736,748	92,175	36,169	104,057	9,511	4,153	625	201,085	147,537	47,269	218,359	207,462	16,385	8,001	4,434	1,383
1828	268,278	212,530	539,292	107,164	38,160	70,091	5,333	3,125	726	204,841	171,770	69,067	279,867	289,474	1,789	9,202	4,633	2,552
1829	635.905	162,816	575,552	146,881	34,260	91,738	487	4,026	946	176,490	155,095	46,594	302,084	314,182	941	11,690	6,568	3,366
1830	2,007,070	196,636	1,170,043	161,275	33,591	90,338	2,677	3,385	813	144,646	143,057	14,894	242,726	264,436	8.946	7,469	6,952	3,647
1831	314,286	192,310	848,108	140,395	40,124	104,849	2,549	3,423	2,220	175,938	155,499	30,164	289,421	296,072	4,992	7,203	10,095	2,282
1832	781,628	230,024	559,399	123,546	58,309	118,924	3,413	4,770	2,515	257,657	191,467	30,159	341,512	329,269	13,337	4,349	325	2,536
1833	1,597,866	260,158	1,166,137	178,820	52,104	63,944	7,676	6,948	1,741	165,745	160.235	20,737	409,729	381,643	26.300	3,786	1,317	2,624
1834	773,807	193,421	756,160	85,208	49,042	77,458	25,763	13,827	2,822	359,488	215,963	68,276	507,808	443,564	13,784	6,643	5,478	1,836
1835	2,066,907	224,257	1,399,236	81,100	44,522	88,182	19,255	11,257	4,320	264,388	204,580	73,379	614,405	616,772	28,959	8.054	4,691	2,398
1836	1,951,202	284,558	1,136,821	122,142	44,468	75,164	24,951	17,193	9,329	279,902	231,134	38,444	667,165	512,856	25,220	7,999	4,794	2,778
1837	1,978,119	272,854	1,473,420	162,749	51,316	94,281	15,315	17,785	2,745	349,993	240,222	86,599	814,808	749,739	21,423	8,192	3,661	2,892
1838	1,450,380	405,271	2,067,992	118.469	45,389	84,627	18,627	28,396	2,214	293,555	280,890	68,889	893,061	679,571	17,070	7,281	6,305	2,657
1839	2,273,696	340,469	1,875,509	120,065	34,034	31,345	20,922	19,265	802	364,343	314,548	55,240	402,968	710,541	11,995	9,067	5,383	2,531
1840	2,157,918	330,070	1,518,411	45,208	40,975	55,076	51,969	34,832	512	337,817	309,204	57,423	745,044	439.091	1,674	8,462	6,857	2,763
1841	1,823,180	302,814	1,768,307	95,701	42,930	67,877	76,311	52,497	2,621	416,930	349,773	92,622	125,755	202,249	74,401	7,484	4,820	3,776
1842	2,006,911	258,648	1,457,443	128,670	45,221	72,695	45,646	50,994	4,628	417,722	323,186	93,583	171,854	309,603	12,462	8,405	5,222	3,148
1[illegible]3	2,090,507	251,810	1,286,922	268,766	59,774	147,232	23,219	41,332	3,825	627,172	348,792	144,857	867,219	640,861	54,298	8,764	7,339	1,386
1844	2,148,351	244,664	1,713,735	206,015	54,825	123,351	37,615	44,276	2,172	349,870	329,696	103,951	452,936	545,025	27,029	8,967	6,459	2,395
1845	1,869,744	—	1,418,064	323,416	—	177,860	43,213	42,943	1,238	486,621	—	89,372	661,892	—	25,577	8,902	—	2,349
1846	1,840,583	—	1,597,519	427,694	—	185,229	38,595	45,671	631	459,367	—	77,039	820,317	—	6,386	10,210	—	2,918
1847	2,542,857	—	1,518,164	305,736	—	223,406	55,165	40,773	2,708	512,374	—	67,462	785,181	—	27,797	8,638	—	4,626
1848	1,562,663	—	896,650	116,005	—	180,899	65,504	66,782	2,442	515,076	—	102,077	668,393	—	36,079	7,547	—	3.036
1849	2,682,592	—	1,252,608	94,914	—	145,479	83,711	72,471	5,317	566,794	—	161,362	845,368	—	33,605	7,812	—	2,924
1850	855,079	—	1,014,492		—					529,012	—		664,630	—			—	

THE PROPAGATION OF LEECHES, AND NOTICE OF AN INSECT WHICH PREYS ON THE YOUNG LEECH.

BY M. LÉON SOUBEIRAN.

In the month of April last, my father constructed a reservoir at the *Pharmacie Centrale des Hôpitaux*, with the view of propagating leeches and of discovering the best conditions for this purpose. This reservoir was of a circular form and lined with lead. Its diameter was about three yards, and its depth about twenty inches. A current of water could be established at pleasure by means of a jet, and the reservoir was covered with a thin linen cloth to prevent the escape of the leeches. At the bottom of the reservoir was placed a layer, ten inches thick, of clayey earth, in which were placed a number of aquatic plants, namely, *Iris pseudo-acorus*, *Typha angustifolia* and *latifolia*, *Caltha palusris*, *Pontedetria cordata*, *Nymphæa alba*, and above all the *Chara*.

In one part of the reservoir a small island was formed, on a level with the water, composed of a layer of clay, covered with vegetable earth and grass. This was to enable the leeches to leave the water and to bury themselves in the moist earth when they desired it.

In the reservoir thus prepared were placed three hundred fine Hungarian leeches, and they were left there until the month of September. During this period, nutriment was only supplied to them on three occasions; twice in the form of blood, and once of frogs.

In supplying the blood to the leeches, a small quantity was first poured into the water, and then the clot was placed on a piece of floating wood.* Attracted by the odour of the blood, they come from all points of the reservoir, mount the piece of wood, and attach themselves to the clot, which they do not leave until nothing remains but a small quantity of discoloured fibrine. On throwing frogs into the reservoir, they soon become the prey of the leeches, and die in a very short time exhausted by the loss of blood. One fact which appeared to me worthy of being noted, is that the leech does not attack indifferently all parts of the body of the reptile, but attaches itself in preference to the eye-lids; and in this way some few of the victims that were thrown in as food had five or six of the leeches fixed by their suckers around the eyes, from which they were unable to release themselves by any effort. Having accidentally thrown in a toad with the frogs, he escaped unhurt, for although the leeches pursued him with rage, they were repelled by the thickness of his skin, and his nauseous odour. They never attached themselves to him, and at length abandoned him entirely.

I ought to remark, that although the water was not changed during this long period, and was kept up to the same level, it always remained clear and limpid, owing to the sanitary influence of the plants.

Towards the latter end of September we proceeded to search for the leeches, in order to ascertain the extent to which propagation had occurred. After having caught a certain number of them by beating the surface of the water, the clay which formed the bottom of the reservoir was mixed up with the water and passed through a sieve, so that none might escape.

By this means both the adult leeches and those of about a centimètre in length were caught, and appeared to be in the finest condition. We proceeded carefully to seek for the cocoons, of which we found none, either in the earth surrounding the reservoir, nor in the clay, nor in the earth or grass of the island. Were we to conclude from this, that the leeches had not been under favourable conditions for re-production? No, certainly, for on examining the leaves of the Typha and the Iris, we found about a hundred young leeches of about a centimètre in length, which had been hidden in the internal folds of the leaves, and appeared to prefer those of the Iris.

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* The leeches may be attracted by beating the surface of the water for a few instants, but this is unnecessary when blood is used. as they are soon attracted to the surface by its odour.

But together with the leeches, the water in the reservoir contained a small pale animal, having a lengthened and depressed body, four antennæ, of which two are longer than the others, and at the posterior part of the body is a tail formed of a single segment with two bifid styles. Under this tail are appendages for respiration. The feet are furnished with hooks. The animal does not swim, but walks along the bottom of the reservoir, and up the stems growing in the water. A large number of them were found upon the sieves which had been used for catching the leeches, and on the stems of the Iris and Typha; but especially within the folds of the leaves with the young leeches.

I put a certain number into a jug half filled with water, together with a few young leeches, on which they speedily fixed themselves, and the leeches were unable by any efforts to get rid of them. In a short time, exhausted by their enemy, they ceased to defend themselves, and became an easy prey.

I wished to ascertain if these animals would attack the full grown leech, and I put a few of them with two adult leeches, into a jug of water. After a few minutes they fixed themselves on the leeches, who struggled violently to free themselves from these formidable enemies, but whatever were their efforts, they were unable to do so. I do not think, however, that adult leeches have much to fear from these animals, for, during six days that they remained together, those I had used did not appear to have suffered, and had ceased to avoid them.

This formidable enemy of the young leeches is a crustaceous animal, which is very common in the waters of the Seine, and in some of the ponds in the environs of Paris. It is the *Asellus vulgaris*, Geoff., or *Oniscus aquaticus*, Linn.

I think I may conclude from these observations, that the great abundance of these animals in the waters of the Seine, and the ponds in our environs, will always prove an obstacle to the successful propagation of leeches in our country. Besides, I am very much inclined to explain in this manner an observation made by the leech merchants of Paris, to the effect, that, although they frequently observe young leeches in their ponds, yet, in a short time, these hopes of a new generation have completely disappeared. If, then, attempts are to be made to propagate the leech in the neighbourhood of Paris, care must be taken not to fill the reservoirs with Seine water, and to ascertain that the ponds in which they are to be deposited do not contain the *Asellus vulgaris*, in addition to which, other enemies to the leech should be sought for.

I thought I ought to publish this note, because authors do not notice the *Asellus vulgaris* as one of the enemies of the leech, and because it indicates one of the obstacles which may tend to prevent the propagation of leeches in our ponds. Successful attempts can only be made at the propagation of the leech, when all the animals which attack it at different ages have been discovered.—*Journal de Pharmacie.*

ON THE TESTING OF CINCHONAS BY MEANS OF CHLOROFORM.

BY M. RABOURDIN.

I SHALL endeavour to show, in the following paper, the means by which we may estimate the alkaloids in cinchonas, by applying the property which chloroform possesses of dissolving these bodies when contained in an aqueous liquid.

Test of Grey Cinchonas.—Ten drachms of the grey cinchona bark of commerce, powdered and passed through a fine horse-hair sieve, is to be moistened with a sufficient quantity of water acidulated by hydrochloric acid (five drachms of acid to 2½lbs. of water), and then packed in a displacement apparatus. A sheet of filtering paper is placed over it, and the powder treated with the acidulated water, which is continued until the liquor which passes through becomes almost colourless, and devoid of bitter flavour (when the powder is uniformly and properly packed it becomes exhausted when about six or seven ounces of liquid have been passed through it); 1½ drachms of caustic potash, and 7½ drachms of chloroform, are added to the liquor, which is to be quickly agitated for a few moments, and then allowed to settle. After a short time, never exceeding half an hour, the chloroform subsides to the bottom, carrying the whole of the cinchonine with it. The red and transparent liquid floating on the top of the deposit is to be poured off, care being taken not to remove any of the latter; water is to be added several times until the deposit is thoroughly washed; and then it is poured into a porcelain capsule. This matter is composed of a liquid portion, which is a solution of cinchonine, in chloroform, and of a semi-solid reddish portion, consisting of cinchonine, of chloroform in a state of emulsion, and of red cinchonic. The capsule is placed on a bath of boiling water, in order to evaporate the chloroform, and the residue is treated with water acidulated with hydrochloric acid, which dissolves the whole of the cinchonine and a portion of the red cinchonic. It is then to be filtered, and solution of ammonia diluted with fifteen or twenty times its volume of water added to it. This addition is made drop by drop, keeping it continually stirred; as soon as a white cloud appears which is not dispersed by the agitation, a sufficient quantity of the solution has been added. This part of the process effects the precipitation of the red cinchonic without touching the cinchonine. It is easy to determine when to terminate this part of the process, as the red cinchonic is precipitated in the form of reddish brown flakes, and the cinchonine, on the contrary, in white curdled flakes. When a sufficient quantity of dilute ammonia has been added, the liquor, which ought to be colourless, is filtered; the filter then washed with a little distilled water, and the united liquors precipitated by an excess of ammonia; the precipitate, which consists of pure cinchonine, whose chemical properties it is easy to determine, is then collected, dried, and weighed.

The first experiment yielded me 2.9 grains of cinchonine, and a second produced three grains. In taking the highest figure, we have 75 grains of alkaloid in 2lbs. 8oz. of grey cinchona.

Test of Yellow Cinchonas.—It is not necessary to operate on more than five drachms of the yellow cinchona bark, as the proportion of organic alkali in this variety of cinchona is much greater than that of the grey cinchona.

Five drachms of yellow cinchona, powdered, and passed through a fine horse-hair sieve, are to be exhausted with acidulated water, as in the case of the grey cinchona. The addition of the liquor is to be discontinued when it passes through colourless and insipid: we thus obtain from five to six ounces of liquid, to which 1½ drachms of caustic potash and five drachms of chloroform are added. These are to be agitated for a short time, and afterwards allowed to subside; there is then a dense whitish deposit formed, consisting of quinine, cinchonine, and chloroform; sometimes the separation is complete and effected in an instant, leaving a red transparent liquid floating on the surface, which may be immediately poured off; the chloroformic solution is then washed; collected in a small capsule, and by the spontaneous evaporation of the chloroform, the alkaloids remain in a pure state.

I think it unnecessary to speak of the testing of red cinchonas; as they resemble the yellow, of which I have just spoken, and all I have stated respecting the latter is applicable to them.—*Repertoire de Pharmacie.*

CEDRON.

[In the January Number, p. 344, of the Pharmaceutical Journal, we gave an account, by Sir W. Hooker, with a figure, of the Cedron (*Simaba Cedron*, Planchon): the following is a further notice of it. We understand that these seeds have been tried in the West Indies as a remedy for cholera, but failed.—Ed. Pharm. Journ.]

We are glad to find that our friend Mr. Purdie, of the Botanic Garden, Trinidad, has seen in the French papers the notice that was taken of the *Cedron*, as mentioned in our last number of the *Kew Garden Miscellany*, p. 378, and he has just sent us some further particulars, which he had published in the *Port of Spain Gazette*, and which we here give—

"During my travels in New Granada (South America), I had often heard of the virtues of the *Cedron*, long before I had the pleasure of meeting with the tree. It is rare to find a Peon or Ariero without a seed, although they are expensive. I have, myself, paid a dollar a seed at San Pablo, where the tree is indigenous, even within the precincts of the village. Its use is not confined to the cure of serpent bites alone, but has the reputation of superseding sulphate of quinine in cases of fever, and that in the country of the cinchona barks.

"Now, about eight years ago, the Government of New Granada sent a commission of several medical men and students, accompanied by Dr. Cespides (Professor of Botany in the University of Bogota), to ascertain what plant produced the *Cedron*, its locality, and quantity procurable. You now see it in all the apothecaries' shops in the different towns of that Republic; so that now, in the midst of forests of the Peruvian bark tree, another remedy, at least equally specific (and that without any chemical preparation), is in process of superseding it. During my stay in Bogota, I was informed of the locality of the *Cedron* (by Dr. Cespides, a gentleman of considerable knowledge and experience in the plants of New Granada), which I found would be on my route from the province of Antioguia, by way of the Rio Magdalena. Thus, Providence has decreed, that out of the alluvial and pestilential plains of this magnificent river, a remedy should come for the cure of its own maladies. On my reaching the village of Nari, in the great valley of the Magdalena, in August, 1846, I found that the surrounding woods contained the celebrated *Cedron*, as also lower down the river at San Pablo. I was glad to find that it was the season of its having ripe fruit. The villagers had already collected each their little hoard of *Cedron*, although they would not show me more than a few seeds, unless I would purchase some. The mode of preparation is simple and easy:—the fruits are gathered, which resemble in appearance a large peach; the outer rind or covering is thick, fleshy, and excessively bitter, and its large seed is immediately surrounded by a not very compact fibrous substance, which answers the purpose of the stone in stone fruits; this is all removed, and the seed taken out, separated in two pieces at the natural fissure (which are called by botanists the cotyledons), and dried in the sun. Beyond a limited quantity of these, it was no object to me to obtain; what I particularly wanted, was a knowledge of the tree, and ripe vegetating seeds; those dried in the sun will never vegetate. I was told that it would be useless for me to go to the woods, as the trees had already been pillaged in all directions. This, however, did not deter me from trying; and after three days' search, at some distance from the village, I obtained about thirty fruits, each containing one seed and the germ of a plant. A few I preserved entire in spirits, the rest I planted in a box of earth at once, to prevent their perishing, as is the case with most large seeds, if not kept constantly excited. Those I sent to the Royal Botanic Gardens, Kew, grew well; and at the present time, plants of *Cedron* would be more easily obtained at the Royal Botanic Gardens, Kew, than in its native country. Those I brought to the Botanic Garden, St. Ann's, are thriving well—some of the trees are now seven feet in height."—*Hooker's Journal of Botany.*

ON ZINC YELLOW AND ZINC GREEN.

BY M. L. ELSNER.

Having undertaken some experiments on zinc yellow and zinc green, the following were the results, which are not devoid of interest to those studying chemistry as applied to the arts:—

I obtained a very fine zinc yellow by pouring neutral chromate of potash into a boiling solution of chemically pure sulphate of zinc (it is well known that bichromate of potash does not give any precipitate in a solution of sulphate of zinc). The precipitate, which was of a brilliant yellow, was washed repeatedly with distilled water, which water, after some time, became coloured, whilst the beautiful yellow colour of the chromate of zinc became much paler, a circumstance which appears disadvantageous in the application of it to the general purposes for which this colour is used. By adding to it some recently precipitated Prussian blue, we obtain all the different shades of green, but the greater number of them are of a dull colour, and the repeated washings weaken the shades, owing, probably, to the instability of the chromate of zinc. The green colour was quite as variable when a solution of zinc and sulphate of iron was added to a solution of yellow prussiate of potash, and the neutral chromate of this base; only it may sometimes be observed that the green precipitate, while it is yet in suspension, becomes of a perfectly rusty yellow colour, a phenomenon probably due to the formation of chromate of iron, as we know that the solutions of iron form yellow precipitates with neutral chromate of potash.

A fine green precipitate may be obtained by a solution of neutral chromate of potash with sulphate of copper; but again, this brilliant colour is destroyed by washing with cold water, which always passes through of a yellow colour, whilst even from the commencement the green precipitate becomes gradually of a blue colour. Another kind of green may be prepared by a mixture of yellow chromate of zinc with indigo carmine (a solution of indigo precipitated by carbonate of potash). Finally, we may obtain, as is known, a fine colour by mixing indigo carmine with an aqueous extract of saffron.—*Moniteur Industriel.*

EAU DE COLOGNE

BY PROFESSOR VARRENTRAPP.

This well-known perfume is a solution of different volatile oils in pure strong spirit. The principal condition for the preparation of a fine water, is the employment of a spirit quite devoid of fusel-oil (oil of grain) and of all foreign odour.

In respect to the proportion and kind of oils employed, we have numerous formulæ. It is of importance that these oils, which are usually purchased of the Druggists of the south of France, should be of the finest quality, and that no oil should be used in sufficient quantity to allow of its peculiar odour being recognisable in the mixture. The oils are to be dissolved in spirit, and the mixture allowed to stand for some weeks (or still better for some months) to improve its odour. Distillation does not effect this; on the contrary, a fresh distilled water requires to be kept a much longer time. Distillation is indeed objectionable, for on account of the greater volatility of the spirit, the oils in part remain behind in the still. Distillation can improve the odour only when the less volatile oil has been used in too large a quantity, and we wish to obtain a better proportion. Before all things, we should employ a pure, old, strong spirit, and not too much of, nor a too strongly smelling, oil.

The different sorts of volatile oil which are obtained from varieties of citrons, oranges, and lemons, in different states of maturity, are the most important, and, therefore, it is most important to ascertain their purity and goodness.

Förster gives the following formula for the preparation of a fine Eau de Cologne: Take of rectified spirit of 82 per cent. of Tralles (= sp. gr. 0.855) 6 [wine] quarts; essence of oranges, essence of bergamot, essence of citron, essence of limette, and essence of petits grains, of each, ℥j ; essence of cedro, essence of cedrat, essence de Portugal, and essence de neroli, of each ℥ss; oil of rosemary, ʒij; and oil of thyme, ʒj.

Otto gives the following formula for a good Eau de Cologne: Rectified spirit of 86 per cent. of Tralles (= 0.846 sp. gr.) 200 [wine] quarts; oil of citrons, ℔iv; oil of bergamot, ℔ij; oil of neroli, ¾℔; oil of lavender, ℔ss; oil of rosemary, ¼℔, and spirit of ammonia, ℥ss. Mix.

ON THE PREPARATION OF SMYRNA OPIUM.

BY LANDERER.

THE so-called Smyrna opium is prepared in the interior of Asia Minor, and chiefly in Kara Chissar, and in the neighbourhood of Magnesia.

The plantations are in the neighbourhood of a few small houses, which contain copper-kettles fixed in the walls, casks, and shelves for drying the opium-cakes. The exhalations emitted by these plantations, especially in the morning and after sunset, are described by the Turks as very dangerous, and they avoid them by retiring towards evening to their huts, which they do not leave till after the rising of the sun. The author has himself experienced the effects, which manifested themselves by giddiness, dejection, and uneasiness. As soon as the moisture of the atmosphere (which in the East is proportionately greater than in other countries, and supplies the place of the rain) begins towards evening to be condensed, a strong narcotic smell is developed. This, in those unaccustomed to it, gives rise, in about a quarter of an hour, to headache and nausea. The plants, grown partly from white, partly from blue seeds, attain a height of six to eight feet; and the labourers engaged in making the incisions into the capsules are quite invisible when working in the plantations. The size of the poppy-heads differ considerably; but if they are intended to grow very large, for the purpose of obtaining a greater quantity of opium of the first quality, about half or three quarters of the heads are cut off, by which the remainder often attain the size of a child's head. The capsules which have been cut off are dried, and from the seeds, which are called *chas chas*, the natives prepare oil, which is exported to France; they also make use of it for culinary purposes, but dishes dressed with it are apt to produce headache and inclination to vomit, especially if the oil has not been heated. By means of a fork-like instrument or a bent knife, incisions are made on the capsules, either parallel or crosswise, and these are repeated as long as the milky juice escapes. To prevent any portion of the abundantly flowing juice being lost, it is caught in small sea mussel-shells (Ἀχιβάδες), dried in the sun, and kept separate as the best quality. The incisions are generally made before sunrise, and every evening the dried but still soft juice is gathered from the plants, with more or less of the epidermis, by which the quantity is increased. The capsules, which yield no more juice, are cut off, tied in bundles, dried in the sun, and opened with a small knife in order to remove the seeds. Seeds obtained from capsules which have been used for the preparation of opium, if sown, yield an inferior opium: hence the seeds which are sown are those which have been obtained from poppies not used for producing opium. The next process is the boiling of the poppy-plants. Having been cut down with sickles, they are tied up in bundles and sent to the laboratory; there the leaves are separated from the stalks, and placed in the kettle for boiling. When perfectly boiled, both leaves and stalks are spread out in the fields, and towards the end of September they are burnt and the ashes employed as manure, together with sheep and goat dung. The decoctions which have been obtained by the first boiling, are then, without previously being filtered, evaporated in separate copper-kettles to the consistency af a solid extract; but although the mass is constantly stirred with wooden spatules, this process is performed with great carelessness, and the extract is often burnt during the process. Before making it into cakes, a part of the opium obtained by incision (*Lacrymæ Opii*), is added at discretion to the extract produced by boiling, and the whole kneaded, partly with the hands, partly with a sort of large spoon. It is then formed into cakes of different sizes, wrapped in fresh poppy-leaves, and placed on the shelves to dry. It is the opinion of experienced opium manufacturers, that the half-dried cakes of even very inferior quality are much improved if exposed every morning and evening to the abundantly falling dew. The perfectly dried cakes are then packed in small boxes filled with poppy-leaves, and sent to the bazaars, where they are sold by *okkas* and *dramms*.—*Archiv der Pharmacie*, September, 1850, p. 293.

ADULTERATION OF OPIUM WITH SALEP POWDER.

A PECULIAR adulteration of opium was discovered by Landerer in preparing laudanum from an apparently very good opium, obtained direct from Smyrna. After several hours' digestion the tincture assumed a slimy or mucilaginous condition, and in a few days acquired a gelatiniform condition, and could not be poured out from the glass. By a careful examination, salep powder in large proportion was discovered in the opium; and the author was afterwards informed, that this is a very common adulteration, which is practised in order to make the opium harder, and to accelerate the process of drying it.—Buchner's *Repertorium*, Bd. vi., Heft 3, p. 349.

[Dr. Pereira (*Elements of Materia Medica*, vol. ii., p. 1742, second edition) mentions a kind of opium which contained a gelatiniform substance; and Mr. Morson (*Pharm. Journ.*, vol. iv., p. 503) has described an opium which yielded a bulky gelatinous-looking mass.—ED. *Pharm. Journ.*]

BUCHU.

Diosma (Barosma) *crenata*, D. C. A glabrous branchy shrub. *Branches* round, purplish, the upper and smaller ones angular. *Leaves* stalked, smooth, oblongo-ovate, blunt, dotted beneath, and notched with transparent, resinous glands on their margin. *Flowers* peduncled, solitary, axillary; petals, white, oblong, subsessile.

In trade, this valuable drug is often adulterated by the substitution of less powerful sorts of the same family of plants, which, although of a similar smell, are by no means equal to it in their therapeutical effects. One of these plants is the *Diosma* (Barosma) *serratifolia. Lodd.*, a species common in the district of Swellendam; and another, the *Empleurum serrulatum, Sol.*, easily distinguished by its linear-lanceolate, serrated leaves.

The true *Diosma crenata* is a native of the mountains of Hottentot's Holland, Stellenbosch, Drakenstein, Tulbagh, and Worcester.—*Floræ Capensis Medicæ Prodromus, by L. Pappe M.D.*

ATOMIC WEIGHTS OF SIMPLE BODIES.

In the following Table, the numbers contained in columns I. and II., are deduced from those given by Berzelius, in the fifth edition of his *Lehrbuch*; and in column III. those atomic weights are added which Gerhardt and Laurent have quoted in the first number of the fifth volume of their *Comptes Rendus*:—

DENOMINATION OF THE SUBSTANCES.	SYMBOLS.	I.—EQUIVALENTS.		II.—ATOMIC WEIGHTS.		III.—EQUIVALENTS (*after Gerhardt and Laurent*).	
		O=100.	H=1.	O=100.	H=1.	O=100.	H=1.
Aluminium	Al.	170.900	13.694	170.900	27.388	85.63	13.70
Antimony	Sb.	1612.903	129.239	806.452	129.239	403.25	64.50
Arsenicum	As.	938.800	75.224	469.400	75.224	468.50	75.00
Barium	Ba.	855.290	68.533	855.290	137.066	425.00	68.00
Bismuth	Bi.	1330.377	106.600	1330.377	213.200	1312.50	210.00
Boron	B.	136.204	10.914	136.204	21.828	67.50	10.80
Brome	Br.	999.620	80.098	499.810	80.098	500.00	80.00
Cadmium	Cd.	696.767	55.831	696.767	111.662	350.00	56.00
Calcium	Ca.	251.651	20.164	250.000	40.000	125.00	20.00
Carbon	C.	75.120	6.019	75.120	12.038	75.00	12.00
Cerium *(Marignac)*	Ce.	590.800	47.264	590.800	94.528	—	—
Chlorine	Cl.	443.280	35.517	221.640	35.517	221.87	35.50
Chromium	Cr.	328.870	26.352	328.870	52.704	162.50	26 00
Cobalt	Co.	368.650	29.539	368.650	59.078	185.00	29.60
Copper	Cu.	395.600	31.699	395.600	63.398	198.75	31.80
Didymium *(Marignac)*	D.	620.000	49.600	620.000	99.200	—	—
Erbium	E.	—	—	—	—	—	—
Fluorine	Fl.	235.435	18.865	117.717	18.865	116.85	18.60
Gold	Au.	2458.330	196.982	1229.165	196.982	1225.00	196.00
Glucinium	G.	87.124	6.981	87.124	13.962	—	—
Hydrogen	H.	12.480	1.000	6.240	1.000	6.25	1.00
Iodine	I.	1585.992	127.082	792.996	127.082	787.50	126.00
Iridium	Ir.	1232.080	98.724	1232.080	197.448	—	—
Iron	Fe.	350.527	28.087	350.527	56.174	175.00	28.00
Lanthanium *(Marignac)*	La.	588.000	47.040	588.000	94.080	—	—
Lead	Pb.	1294.645	103.738	1294.645	207.476	650.00	104.00
Lithium	Li.	81.660	6.543	81.660	13.086	40.16	6.40
Magnesium	Mg.	158.140	12.671	158.140	25.342	75.00	12.00
Manganese	Mn.	344.684	27.619	344.684	55.238	175.00	28.00
Mercury	Hg.	1251.290	100.026	1250.000	200.000	625.00	100.00
Molybdenum	Mo.	596.100	47.764	596.100	95.528	—	—
Nickel	Ni.	369.330	29.594	369.330	59.188	185.00	29.60
Niobium	Nb.	—	—	—	—	—	—
Nitrogen	N.	175.060	14.027	87.530	14.027	87.50	14.00
Norium	No.	—	—	—	—	—	—
Osmium	Os.	1242.624	99.569	1242.624	199.138	—	—
Oxygen	O.	100.000	8.000	100.000	16.000	100.00	16 00
Palladium	Pd.	665.477	53.323	665.477	106.646	—	—
Pelopium	Pe.	—	—	—	—	—	—
Phosphorus	P.	392.041	31.414	196.021	31.414	200.00	32.00
Platinum	Pt.	1232.080	98.724	1232.080	197.448	618.75	99.00
Potassium	K.	488.856	39.171	488.856	78.342	243.75	39.00
Rhodium	R.	651.962	52.240	651.962	104.326	—	—
Ruthenium, according to *Claus*	Ru.	651.000	52.163	651.000	104.326	—	—
Selenium	Se.	495.285	39.686	495.285	79.372	490.90	78.50
Silicium	Si.	277.778	22.258	277.778	44.516	87.50	14.00
Silver	Ag.	1349.660	108.146	1349.660	216.292	675.00	108.00
Sodium	Na.	289.729	23.215	289.729	46.430	143.75	23.00
Sulphur	S.	200.750	16.086	200.750	32.171	200.00	32.00
Strontium	Sr.	545.929	43.744	545.929	87.488	275.00	44.00
Tantalium	Ta	1148.365	92.016	1148.365	184.032	—	—
Tellurium	Te	801.760	64.244	801.760	128.488	800.00	128.00
Terbium	Tb.	—	—	—	—	—	—
Thorium	Th.	743.860	59.604	743,860	119.208	—	—
Titanium	Ti.	301.550	24.158	301.550	48.316	—	—
Tin	Sn.	735.294	58.918	735.294	117.836	368.75	59.00
Tungsten	W.	1188.360	95.22	188.360	190.442	600.00	96.00
Uranium	U.	742.875	59.526	742.875	119.050	750.00	120.00
Vanadium	V.	856.892	68.661	856.892	137.322	—	—
Yttrium	Y.	—	—	—	—	—	—
Zinc	Zn.	406,591	32.579	406.591	65.158	206.25	33.00
Zirconium	Zr.	419.728	33.632	419.728	67.264	—	—

The following is a table of atomic weights corrected and fixed by various Chemists in recent times :—

DENOMINATION OF THE SUBSTANCES.	SYMBOLS.	EQUIVALENTS.		ATOMIC WEIGHTS.	
		O=100.	H=1.	O=100.	H=1.
Calcium (*Erdmann* and *Marchand*) ...	Ca.	250.000	20.000	250.000	40.000
Carbon " "	C.	75.000	6.000	75.000	12.000
Hydrogen	H.	12.500	1.000	6.250	1.000
Iron (*Erdmann* and *Marchand*)	Fe.	350.100	28.000	350.100	56.000
Mercury " "	Hg.	1250.000	100.000	1250.000	200.000
Phosphorus (*Pelouze*)	P.	400.300	32.024	200.150	32.024
Sodium "	Na.	287.170	22.973	287.170	45.946
Strontium "	Sr.	548.020	43.841	548.020	87.682
Sulphur (*Erdmann* and *Marchand*) ...	S.	200.000	16.000	200.000	32.000

Within the last few years the following atomic weights have been revised:—

Barium	Ba...	856.770	Marignac.
Calcium	Ca...	350.000	Erdm. and March.
Chromium	Cr...	333.500	Lefort
Chromium	Cr...	335.091	Moberg.
Fluorine	Fl....	237.500	Louyet.
Magnesium.........	Mg..	152.550	Jacquelain.
Magnesium.........	Mg..	154.490	Svanberg.
Magnesium.........	Mg..	150.000	March. and Scheer.
Molybdenum.......	Mo...	574.750	Berlin.
Molybdenum.......	Mo...	574.829	Svanb. and Struve.
Tungsten...........	W....	1150.780	Schneider.

—*Central Blatt*, January, 1851, page 1.

THE MEDICAL AND SURGICAL PRACTITIONERS' SOCIETY.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

57, *Lincoln's Inn Fields*, *Feb.* 22*nd*, 1851.

Sir,—Our attention has just been called to your remarks in the case of Perkins *v.* Walker, in the last number of your Journal.

We beg to inform you that the Medical and Surgical Practitioners' Society was not in any way connected, either directly or indirectly, with that case, of the proceedings in which, the Council and officers of the Society were totally ignorant. We are, Sir, your obedient Servants,

Prichard and Collette.

[We are glad to find that the above Society is not implicated in the case in question.—Ed.]

ROYAL INSTITUTION.

Friday, *January* 31.

(*From the Official Report of the Institution.*)

ON PEAT AND ITS PRODUCTS.

BY PROFESSOR BRANDE.

Referring with commendation to an article entitled "The Irish California," in Dickens's *Household Words*, No. 41, p. 348, Professor Brande disclaimed any purpose of predicting the result of the great enterprise which is described in that able paper. He proposed to confine himself to a statement of what had been done, and what was doing, to make the products of peat commercially valuable.

A peat bog was described as a superficial stratum of vegetable matter, which at different depths is undergoing, or has undergone, various stages of change and decomposition. Its superficial appearance is that of a mass of half-decayed mosses, rushes, heath, and grass; the roots having successively died away, though the plants continued to vegetate. The mass is ligneous, and imbued with humus and humic acid, among other products of slow decay; and the abundance of moisture pervading the bog, affects the character at once of the peat and of the district. The upper layers of the bog are usually loose and fibrous, and of a pale brown colour. Beneath the surface the density is found to increase, sometimes to a great extent. At last, the distinctive characters of the vegetables cease to be discernible, and the mass appears nearly homogenous, and of a dark brown or blackish colour. Trunks of trees, and some curious geological phenomena, occasionally present themselves. A peat district may be regarded, therefore, as the consolidated produce of enormous forests and fields of vegetation, amounting in the aggregate to millions of acres. In Ireland alone, one-tenth of the surface is covered by peat bog, which if removed, would exhibit a soil fit for the operations of agriculture.

Professor Brande then invited attention to different samples of peat taken from the upper, middle, and lower portions of the bog. He particularly noticed the tallow peat of the banks of Lough Neagh, which, from the brilliant flame attending its combustion, is sometimes used as a source of light as well as of heat.

Peat may be rendered valuable, either,

1. From the charcoal which may be obtained from it; or
2. By the various products derivable from what is called its destructive distillation.

When it is desired to convert peat into charcoal, the plan adopted by the Irish Amelioration Society is to carbonize blocks of peat, partially dried on trays of wicker work, in moveable pyramidal furnaces. The charcoal so obtained varies in character with that of the peat which produces it; and when the peat is compressed, previous to its carbonization (which may be well effected by means of a machine invented by Mr. Rogers, and which was explained by reference to a diagram), the resulting charcoal exceeds the density of common wood charcoal. In stove-drying, dense peat loses about one-third, and the light and porous, half of its weight; four tons of dried peat will give about one ton of charcoal. The efficacy of this charcoal in the manufacture of iron, in consequence of the small quantity of sulphur it contains, was mentioned, and its deodorizing and purifying qualities experimentally exhibited.

2. *The products of the destructive distillation of peat* were then described. The elements of peat are essentially those of wood and coal: viz., carbon, nitrogen, hydrogen, and oxygen. If, therefore, peat were distilled in close vessels, the products obtained, would, as might be expected, resemble the products of a similar operation on coal or wood. Hitherto, however, the expense of such a process in the case of peat has precluded its general adoption. Mr. Reece, however, has invented for this purpose a blast-furnace, which differs in principle from that in which iron is melted, by having an arrangement to collect the products of combustion; and he has thus succeeded in obtaining ammonia, acetic acid, pyroxylic spirit, tar, naphtha, oils, and paraffine, together with large quantities of inflammable gases, from the peat. It has been found convenient to place two of these furnaces close to each other, so that one may be at work when the blast is turned off the other, in order to allow of its being charged.

In two furnaces of this kind, ten feet in diameter, and thirty-five feet high, 100 tons of peat may be decomposed every twenty-four hours,

and produce 10,000 gallons liquor (A).
1,000 " tar (B).
6,270,000 cubic feet of inflammable gases (C).

A. The liquor holds in solution sufficient ammonia to yield, when saturated by sulphuric acid, one ton of sulphate of ammonia; enough acetic acid to give, when saturated by lime, 14 cwt. of grey acetate of lime; and, lastly, it contains 52 gallons of pyroxylic spirit. This process was described in detail, and a diagram of the furnaces, and of the apparatus employed for distilling the spirit was exhibited.

B. The tar is quite different from what is obtained from coal or from wood. It is a peculiar greasy-feeling substance. This substance is heated to about 100°, at which temperature it melts; and being then treated, first with about three per cent. of sulphuric acid, and afterwards with hot water, it separates after a time into two layers, the lower consisting of acid, water, and impurities; the upper of paraffine and oils.

This mixture of paraffine and oily hydrocarbons is then submitted to distillation; the first half of the distilled products consists chiefly of hydrocarbons of the naphtha family; the other half contains the denser oils and paraffine; when cold, the paraffine crystallizes, and is separated from the oil by straining and pressure; it is subsequently bleached and decolourized by chlorine or chlorochromic acid, then redistilled, pressed, and steamed, until brought to a state of purity. The heavy oils, from which the paraffine is deposited, are then mixed with the lighter oils, which were separated, in the first instance, by distillation, and with caustic lime. After a time sulphuric acid is added, which combines with impurities. The oils are then distilled, bleached by chlorochromic acid, and deodorized. In this part of the process, the substance called *capnomor*, the properties of which have not been investigated, presents itself.

C. *The gases.*—The greater part of the oxygen of the air which is blown through the furnace, naturally combines in the first instance with the burning carbon, and is converted into carbonic acid. This gas, however, on rising through the intensely heated mass, takes up an additional proportion of carbon to form *carbonic oxide*, which passes off with the hydrogen and gaseous hydrocarbons, also generated by the combustion, and which, notwithstanding the large proportion of nitrogen blended with them, remain in the form of an inflammable mixture, which is ultimately used as fuel to work the steam-engine, and to heat the stills and boilers.

In conclusion, Professor Brande reviewed the various products of peat and their uses.

They appear to be,

1. *Sulphate of Ammonia.* This substance is employed in the preparation of carbonate and muriate of ammonia, of caustic ammonia, and in the manufacture of manures and fertilizing composts.

2. *Acetate of Lime*, which is in constant demand as a source of acetic acid, and of various acetates largely consumed by the calico-printers.

3. *Pyroxyic spirit (or wood alcohol)*, used in vapour lamps (two of which were exhibited, and attention called to the brilliancy of the light afforded) and in the preparation of varnishes.

4. *Naphtha*, used for making varnishes, and for dissolving caoutchouc.

5. *Heavy and more fixed oils*, applicable for lubricating machinery, especially when blended with other unctuous substances; or as a cheap lamp oil, and as a source of lamp black.

6. *Paraffine.* This, when mixed with fatty matter, forms a material for candles, samples of which were shown, consisting of mixtures of paraffine, sperm, and stearine.

BOOKS RECEIVED.

THE AMERICAN JOURNAL OF INSANITY. Vol. vii., No. 2.

THE NEW YORK REGISTER OF MEDICINE AND PHARMACY. Vol. i., No. 5.

THE AMERICAN JOURNAL OF PHARMACY. *New Series.* Vol. iii., No. 2; Vol. vii., No. 1; Vol. xvi., No. 4.

THE NORTH-AMERICAN HOMŒOPATHIC JOURNAL. No. 1!

PRACTICAL OBSERVATIONS ON THE TREATMENT OF DISEASE. E. W. TUSON, F.R.S., &c. 8vo, pp. 55. John Churchill.

CHELTENHAM AND ITS RESOURCES: *Mineral Waters, Climate, &c.* By EDWIN LEE. 8vo, pp. 135.

TO CORRESPONDENTS.

Omega.—(1.) The paper alluded to is not an extract from any work.—(2.) The centrifugal method of drying is a mechanical contrivance by which vessels containing the products to be dried are fixed to a horizontal wheel or plane, which being rotated, the moisture is driven off by the centrifugal force.

A Member (Manchester).—A Member may introduce a visitor to the Museum, or application may be made to the Curator.—(2.) Another volume has lately been issued by the Cavendish Society.

An Apprentice (Blackburn).—The residue of a tincture, or infusion after the separation of the clear liquor, is called the "marc."

Pharmacien (Sunderland).—We are not acquainted with Clutton's Febrifuge Mixture.

M. P. S. (Lewisham).—The usual method of cleaning pictures consists in first removing most of the old varnish by careful rubbing with the finger, then rapidly passing over the surface a little spirit of wine to remove the remainder. The chief danger to be apprehended is doing too much; an inexperienced hand would be likely to spoil the picture.

Omega.—See Pereira's *Materia Medica.*

A. B.—Oil may be coloured of an amber tint with arnatto.

Perseverantia.—(1.) Brookes's *Crystallography.*—(2.) Pereira's *Lectures on Polarized Light.*—(3.) We cannot tell.—(4.) Yes.

Morphe.—(1.) Yes.—(2.) It is uncertain.

H. W.—(1.) Phosphate of soda.—(2.) All that were thought worthy of insertion.

H. A. B.—Such experiments ought not to be performed at all by an inexperienced operator.

Fidele.—Tincture of sumbul is prepared by Mr. Savory, of Bond Street. We believe the formula has not been published.

Triangle.—We do not know how oil of cognac is made.

J. B.—(1.) It is native in France and other places.—(2.) The name indicates the original author.—(3.) To improve the flavour.—(4.) An alkaline solution of the colouring matter of cochineal.—(5). The effect is not peculiar to sulphate of magnesia.—(6.) The relative doses are the best indication.—(7).—Robinson on the Teeth.

Constant Reader.—We do not know the composition of the varnish for boot-leather.

A Young Druggist.—We have no reason to suppose it is not good.

C. M. H.—We know of no test that would be applicable.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Other Communications to the EDITOR (to the care of Mr. CHURCHILL).

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. X.—APRIL 1st, 1851.

THE NEW LONDON PHARMACOPŒIA.

The appearance of a new Pharmacopœia always causes a sensation among those whom it concerns. During the interval since the publication of its predecessor, the march of science, or the fashion of medical practice, has created a demand which the code fresh from Pall Mall East is intended to supply. The Chemist eagerly turns over its pages in order to be ready in case of a demand for new or altered preparations. The book-maker betakes himself to his scissors and his note-book, anxious to be early in the field with a "companion" or a "supplement." The medical practitioner, as in duty bound, procures a copy, and cuts the leaves. With him it is optional whether he owns allegiance to the new code or not. He may be (as many practitioners are) satisfied with the old pharmacopœia; he may supply any deficiences by extemporaneous prescriptions; he studied pharmacy when he was a medical pupil, and is too much engaged in practice to go to school and learn new names and formulæ. Consequently, some jog on in their old track, while others push forward, learn their lesson, and expect those who dispense their prescriptions to be as orthodox as they are themselves. The Chemist, according to law, has no choice. He must obey the Pharmacopœia. At the same time he must fulfil the intentions of the prescriber. We have on more than one occasion, pointed out the relative positions of the prescriber and the dispenser in this respect, and endeavoured through various channels to impress upon the compilers of the Pharmacopœia the importance of so constructing the new edition as not to contradict the old one. It is the undisputed prerogative of the College to multiply or expunge formulæ *ad libitum;* we only claim, on behalf of those who are bound by law to obey, that no term or expression having a double meaning, should be employed in the work to which they refer as an authority.

In the present Pharmacopœia there is much less evidence of a disposition to puzzle and confuse the dispenser than there was in the Pharmacopœia of 1836, and it is obvious that the discussions which have taken place between Medical Men and Chemists since the establishment of the Pharmaceutical Society, have been attended with advantage.

In some respects the present Pharmacopœia is a decided improvement on its predecessors. Many details in the chemical instructions are omitted; the nature of the preparations required being described, while the Chemist is left at liberty to employ such process as he may find best to answer the purpose. Several new preparations are introduced, some defects in old formulæ are rectified, and alterations are made in others. With these general remarks we dismiss the subject until next month.

THE REVIVAL OF THE MEDICAL REFORM QUESTION.

In our number for September last, we noticed the proposed Bill for incorporating the General Practitioners of Medicine, Surgery, Midwifery (and Pharmacy) in a Royal College, and adverted to the endeavours by another party in the profession to bring about a reform in the Royal College of Surgeons, which should supersede the necessity of creating a new corporation.

We have already pointed out the objections against the former of these propositions, which, if carried into effect, would perpetuate the official union of Medical practice with Pharmacy, instead of promoting the recognition of Pharmacy as a distinct branch of the profession.

We have the satisfaction of stating, that a correspondence has recently taken place between the Secretary of State and Mr. Arnott, the President of the Royal College of Surgeons, and that the College has passed the following resolutions, which will, we trust, remove to a great degree, the source of dissatisfaction hitherto prevalent among the members, and thus lead the way to a satisfactory arrangement:—

RESOLUTIONS OF THE COUNCIL OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND,

Respecting certain further Alterations deemed necessary in the Charters and Bye-Laws of the College, and to which they request the sanction of the Secretary of State for the Home Department. (19th and 24th March, 1851.)

1. That in the opinion of this Council such parts of the Charters and Bye-Laws of the College as restrict the eligibility to the Council to Fellows residing and practising Surgery within five miles by highway or road from the General Post Office in Saint Martin's le Grand, should be abrogated.

2. That in the opinion of this Council such parts of the Charters and Bye-Laws of the College as restrict the eligibility to the Council to Fellows not having during the five preceding years practised Midwifery or Pharmacy, and require a certificate thereof by three Fellows, should be abrogated, and that instead thereof a certificate by three Fellows, and a declaration by himself, that the person nominated to be ballotted for as a Member of the Council does not practise as an Apothecary, be required.

3. That it is the opinion of this Council that the Medical qualifications of those about to engage in the practice of Surgery, or in General Practice, should be tested by the Royal College of Physicians.

4. That the Council of this College are prepared to form and superintend a Board of Examiners in Midwifery, or to co-operate with the Royal College of Physicians in the institution of examinations for testing the qualifications of Practitioners in Midwifery.

(By order) Edmund Balfour, *Secretary.*

CRIMINAL AND ACCIDENTAL POISONING.

For several months this subject, which had previously occupied a prominent place in our pages *, has had a temporary interregnum. Our readers will recollect that the endeavour to contrive a kind of enactment which would check the unrestricted sale of poisons, originated with the Provincial Medical and Surgical Association; which body, in conjunction with the Pharmaceutical Society, instituted an inquiry, and a joint report relating to the sale of arsenic was the result. This report, with a memorial from each Society, was forwarded to the Secretary of State, who, towards the close of last session, announced his intention to bring in a Bill for regulating the Sale of Poisons.

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* Vol. ix., pages 160, 205, 249, 253, 297, 302, 352, 458, 543, 557, and 589.

Difficulties arose, other business interfered, the session terminated, Parliament went out of town, and the projected Bill was left among the archives at the Home Office.

Early in the present session the subject was revived. The Earl of Carlisle, in the House of Lords, brought in a Bill intituled, "An Act to regulate the Sale of Arsenic," which passed the third reading on the 24th of March, as follows:—

A BILL, INTITULED AN ACT TO REGULATE THE SALE OF ARSENIC.

Whereas, the unrestricted sale of arsenic facilitates the commission of crime: be it enacted by the Queen's most excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

I. That every person who shall sell any arsenic shall forthwith, and before the delivery of such arsenic to the purchaser, enter or cause to be entered in a fair and regular manner, in a book or books to be kept by such person for that purpose, a statement of such sale, with the quantity of arsenic so sold, and the purpose for which such arsenic is required or stated to be required, and the day of the month and year on which, and the name of the person to whom, such arsenic is sold, and the name of the town or other place, and also the name of the street, square, road, lane, alley, or other like locality, and number of the house, if the same be said to be numbered, where such person shall abide, and whether such person is a lodger in or the keeper of such house, by using the letter "L" if a lodger, and the letter "H" if a housekeeper, into all which circumstances the person selling such arsenic is hereby required and authorized to inquire of the purchaser before the delivery to such purchaser of the arsenic sold, and such entry shall in every case be signed by the person making the same, and shall also be signed by the purchaser, unless such purchaser profess to be unable to write (in which case the person making the entries hereby required shall add the particulars to be entered in relation to such sale the words "cannot write") and where a witness is hereby required to the sale, also by such witness, together with his place of address.

II. No persons shall sell less than ten pounds weight of arsenic at any one time for any purpose whatsoever, or any quantity whatsoever of arsenic required or stated by the purchaser to be required for any agricultural purpose, or for any other purpose, save where such admixture therewith as hereinafter mentioned, is represented by the person purchasing the same, to render such arsenic unfit for the purpose for which it is required, unless the same be first mixed with soot or indigo in the proportion of one ounce of soot or half an ounce of indigo at the least, to one pound of the arsenic, and so in proportion for any greater or less quantity; and no person shall sell less than ten pounds weight of arsenic at any one time to any person other than a male person of full age, or to any person who is unknown to the person selling such arsenic, or who before the delivery of such arsenic on such sale, does not sign his name to the entries herein required on such sale, unless the sale be made in the presence of a witness who is known to the person selling the arsenic, and to whom the purchaser is known, and who signs his name together with his place of address, to such entries before the delivery of the arsenic to the purchaser.

III. If any person shall sell any arsenic, save as authorized by this Act, or on any sale of arsenic, shall deliver the same without having made and signed the entries hereby required on such sale, or without having obtained such sign or signatures, to such entries, as required by this Act, or if any person purchasing any arsenic shall give false information to the person selling the same in relation to the particulars which such last-mentioned person is hereby authorized to inquire into of such purchaser, or if any person shall sign his name as aforesaid as a witness to a sale of arsenic to a person unknown to the person so signing as witness, every person so offending shall for every such offence, upon a summary conviction for the same before two Justices of the peace, be liable to a penalty not exceeding *twenty pounds.*

IV. Provided that this Act shall not extend to the sale of arsenic when the same forms part of the ingredients of any medicine required to be made up or impounded according to the prescription of a legally qualified medical practitioner, or a member of the medical profession, or to the sale of arsenic by wholesale to retail dealers or others in quantities exceeding one hundred pounds in weight at one time, upon orders in writing in the ordinary course of wholesale dealing.

V. In the construction of this Act the word arsenic shall include arsenious acid and the arsenites, arsenic acid and the arseniates, and all other colourless poisonous preparations of arsenic.

It will be observed that the above Bill comprises the substance of two of the propositions contained in the recommendation of the joint committee above referred to, namely:—

"The sale of arsenic by retail, should be restricted to medical men and Chemists and Druggists."

"Arsenic should only be sold to male adults, personally, or on production of their written order.

"The vendor should enter the sale in a book, with the date and the object for which it is required, to which the applicant and a witness (one or the other being known to the vendor) should sign their names, unless a written order is brought, in a handwriting known to the vendor, which order should be pasted in the book."

The Council of the Pharmaceutical Society, in transmitting the above recommendation to the Secretary of State, drew especial attention to the fact that the first clause (suggesting that the sale of arsenic should be restricted to medical men and Chemists and Druggists) would be inoperative until the term Chemist and Druggist be defined by law, by means of an act regulating the qualifications of the members of that body. It is obvious, therefore, that this portion of the recommendation *cannot be carried out at present;* but we think the Bill in its present form comprises as much as will be found practicable under existing circumstances. The clause requiring arsenic to be coloured is very carefully worded, and the exceptions introduced are calculated to meet the objections which would otherwise have been raised against it.

THE SUPPLY OF WATER TO THE METROPOLIS.

In consequence of the impurity of some of the water now furnished to the metropolis, and the insufficiency of the supply, especially in certain crowded localities, several of the Water Companies have applied to Parliament for enlarged powers, with a view of providing a remedy. The progress of all Bills relating to this subject is suspended until after Easter, in order to allow time for the Board of Health to complete the measure which they have for a long time had in contemplation.

The Report and proposed plan published last year by that Board, having proved a failure for various reasons, some of which we noticed in a previous number,* it was deemed expedient to collect further evidence for the purpose of rebutting the objections, and we have before us this additional evidence, including some information respecting sewerage, in four supplementary reports.

There is much contradictory and foreign matter in these documents. The so-called evidence is interspersed with theoretical opinions, random answers to leading questions, and illogical deductions from distorted facts. The bias and tendency of the reports are ingeniously concentrated on the advocacy of the favourite project of the Board of Health, namely, the abolition of the existing Water Companies,—the introduction of a continuous supply of rain-water collected from Bagshot Heath and its vicinity—the rejection of river-water, and the appointment of a Government Commission to manage the job.

The branch of the subject which chiefly claims the attention of Chemists, is the extraordinary, and we think dangerous theory, propounded by the Board of Health as a discovery in regard to the solubility of lead in water, a theory equally at variance with former experience, and with the generally received opinions of Chemists. In some of the early numbers of this Journal (vol. ii., p. 355 and 407, and vol. iv., p. 304) we published the result of numerous experiments by Professors Christison and Daniell, Col. York, Mr. Phillips, jun., and other Chemists, establishing the fact that pure water in the presence of atmospheric air, which always contains carbonic acid, has a strong action on lead, and that the presence of certain salts usually found in moderately hard water, protects the metal, under ordinary circumstances, almost entirely from this action. We also published in the first number of the present volume a report by Dr. de Mussey, of the circumstances under which the late king of the French and his family were nearly poisoned at Claremont, by the use of a comparatively pure water which had passed through lead.

The absence of these salts, which experience has shown to have a protective influence against the action of water on lead, had been urged as a fatal objection to the water recommended by the Board of Health. It was therefore necessary, in order to rebut this objection, to disprove the facts previously established on the subject. This was no difficult task for the Board of Health. A supply of journeymen plumbers was procured, who vouchsafed the evidence required for the purpose; of which the following extracts will serve as specimens:—

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* Vol. x., No. 2.

> "Rain-water never acts upon lead; and I never knew a rain-water-cistern that was decayed." "I have never found any action from the water either in rain-water-cisterns or pipes." "The harder the water, the more it acts on lead: the softer the less it acts." "The hard water eats the cistern away: the soft water, that is, rain-water, does not sensibly touch it at all."

Statements of this kind are much more valuable to the Board of Health than historical facts, or the evidence of professional or scientific men. Knowing how great is the tact of one member of that Board in finding such evidence as he may happen to require, we are not astonished at any result at which he may arrive. But we are surprised to observe that the Editor of the *Lancet* has adopted similar views, founding his opinion on a report of certain experiments which he states, "clearly show how dangerous is the employment of that metal (lead) in any form in connexion with the present water supplies of this metropolis."* He should have confirmed this statement by a statistical return of the cases of lead-poisoning by London water, which have come under his notice during the many years that he has held the office of coroner for Middlesex. No such facts are adduced, but intimidation is substituted for evidence, as follows. In allusion to the water at Trafalgar Square, we are told, "Buckingham Palace, and one or two of our public buildings, are supplied with this water, which is even, we are informed, drank by her Majesty."

Turning from theory to fact, we rejoice in the assurance that her Majesty is in the enjoyment of good health, and has experienced no inconvenience from the use of the water stated to be so dangerous;† while it is on record that her Majesty's buckhounds were not long ago poisoned by drinking the water which the Board of Health and the Editor of the *Lancet* now recommend for the use of her Majesty. No conclusive deduction can be drawn from the few imperfect experiments detailed in the *Lancet*. These experiments consisted in the enclosure of pieces of lead in different samples of water in sealed vessels. The exclusion of atmospheric air, the source of carbonic acid, would, of course, affect the results, and the report on five crude experiments, by an unknown chemical operator, cannot certainly be received as a refutation of the experience of some of our most eminent Chemists, who have arrived at different conclusions after the most careful and elaborate investigations. It should be observed, however, that a part of the proposal of the Board of Health consists in the adoption of the continuous supply, by which means the pipes would always be full, and the free access of air excluded. The objections to this system and the abandonment of cisterns have been discussed elsewhere, but it would be foreign to our purpose to enlarge upon this branch of the subject. We shall only remark, that unless they entirely deprive the soft water of air and carbonic acid, they cannot prevent it from acquiring a poisonous impregnation of lead by contact with the metal.

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* *Lancet*, March 8th.

† Since the above was in type, we have been informed that the water manipulator, who is the author of the above theory, made a precautionary communication in head quarters on the subject; and that on inquiry it was ascertained, 1st. That the statement respecting the rapid action of the water in question on lead was not founded in fact; 2dly. That Her Majesty is not in the habit of drinking that water.

One of the strong arguments of the Board of Health relates to the presence of organic matter in the river water as generally supplied to the public. But it is admitted that the Bagshot Heath water is not free from organic contamination, especially during wet weather, more or less organic colouring matter being derived from the peat on the surface of the ground. This objection is overruled by the assertion that the infusion of peat, although somewhat disagreeable, is not injurious to health, or at all events, it is not so bad as organic impurities derived from animal sources. Here, again, a convenient witness is found who states that the peat (which varies in thickness from four inches to ten feet) might be easily removed at an average expense of about £2 an acre; and that in the place where it is thickest, the peat would pay the expense of removal. The investigation has not yet terminated. Professors Graham, Hoffman, and Miller, are engaged on behalf of the Board of Health in the examination of all the waters supplied, or proposed to be supplied, to the metropolitan public, and similar examinations are in progress on behalf of the water companies. Considerable discrepancy may be anticipated in the results, depending on the circumstances under which the samples are taken. A sample taken on a fine day, after a week or two of dry weather, will, of course, differ from one taken after a storm of wind and rain, when the sediment is stirred up and organic matters are held in suspension, and water from a foul cistern will not be found similar to that in the service-pipe. We presume these circumstances will not be lost sight of by the authors of the reports before us, whose determined purpose consists in the attainment of purity, *economy*, and abundance, by placing the water supply on a similar footing to the Woods and Forests, the Dockyards, and other Government commissions, whose *modus operandi* is too well understood by the public to require further comment.

THE USE OF CHLOROFORM FOR CRIMINAL PURPOSES.

In consequence of the criminal charges which have been brought against persons for the alleged administration of chloroform as a means of facilitating theft and other offences, a clause has been introduced by Lord Campbell into a Bill, entitled "An Act for the better Prevention of Offences." The clause is as follows:—

"IV. And whereas, it is expedient to make further provision for the punishment of persons using chloroform, or other stupifying things, in order better to enable them to commit felonies: Be it enacted, that if any person shall unlawfully apply or administer, or attempt to apply or administer, to any other person any chloroform, laudanum, or other stupifying or overpowering drug, matter, or thing, with intent thereby to enable such offender, or any other person, to commit any felony upon the person to whom the same may be applied or administered, or attempted to be administered, or upon his or any other person's property, every such offender shall be guilty of felony, and, being convicted thereof, shall be liable, at the discretion of the Court, to be transported for life, or for any term not less than seven years."

Dr. Snow, in a well-written pamphlet, addressed to Lord Campbell, points out the impossibility of using chloroform successfully in the class of cases to which this clause is chiefly directed. He states positively, that it would be impossible to produce the requisite effect by the application of chloroform on a handkerchief to a person in the street, or under any circumstances in which the person to whom it is so administered is not either an assenting party, or under such restraint that the felonious object could as easily be effected without resorting to this agent. Several inspirations must be taken before the required effect of chloroform is produced, and during this interval ample time would be allowed for such resistance as would collect a crowd in the street. Even in a case in which the administration was attempted on a person in his sleep, he was awakened by the first effort at inspiration, and such a resistance ensued, that his night-dress was covered with blood, the bed-clothes fell on the floor in the scuffle, and the offender was apprehended.

Dr. Snow takes exception to the introduction of any allusion to chloroform in the clause above referred to, as he considers that, "to legislate on this matter, would revive the groundless fears of the public, which have subsided or been allayed; and might even cause evil-disposed persons to make trial of a means, which they would conclude to be not without efficacy, when it had given rise to a law for its suppression."

The Editor of the *Medical Gazette* takes a different view of the question, observing, that on the assumption that chloroform is harmless in the hands of thieves for the reason assigned, the suggestion would be as harmless as "the advice to catch birds by the application of salt to their tails." It is further objected, that persons might be persuaded, under false pretences, to inhale chloroform voluntarily; or it might be administered to persons half drunk; and that as it is not impossible that other circumstances might arise in which it might be made available for criminal purposes, the enactment of a suitable punishment for such offenders is desirable. In the absence of a specific enactment for this purpose, and in case it should be shown that Dr. Snow's view as to the inapplicability of chloroform for the criminal purposes in question should prove incorrect, the editor observes that "then, voluntary hocussing by laudanum might be a felony punishable by transportation for life, while the thief who selected chloroform would be guilty only of a misdemeanor, punishable by imprisonment."

We fully agree with Dr. Snow in the opinion that the cases of alleged street-hocussing by chloroform hitherto brought before the public, are unsupported by evidence and inconsistent with the known action of chloroform. It may be a convenient subterfuge for a man who finds himself in a scrape, the result of his own folly during intoxication, to conjure up a mysterious and exciting story about chloroform and a handkerchief, for the purpose of throwing dust in the eyes of the magistrate, and working upon the prejudices of the jury. This we conceive to be the chief objection to the prominent place assigned to chloroform in the proposed act, inasmuch as the recognition of the applicability of that agent in such cases may be the means of entailing an unjustly severe punishment for a comparatively trifling offence. This remark is justified by what has occurred, even in the absence of the proposed law; two women having been transported for fifteen years and one for ten years on evidence which, *so far as relates to the alleged hocussing with chloroform*, would not be believed by any person accustomed to witness the inhalation of this agent. There is, however, a criminal purpose to which chloroform might be available, namely, as a substitute for murder to suppress evidence in a case of burglary; and, as other instances may possibly arise, the law should be sufficiently comprehensive to meet all exigencies, but we cannot agree with the Editor of the *Medical Gazette* in the opinion that the omission of the word *chloroform* in the Act would in any degree invalidate it. The words "or other stupifying or overpowering drug, matter, or thing," comprise chloroform, ether, laudanum, Indian hemp, hemlock, spirituous liquors, or any other agent of a similar nature; and this, we conceive, removes the necessity of paying the special compliment to chloroform.

We understand that Lord Campbell intends to retain the clause in its present state. Whether this be done or not, the ends of justice require that no conviction for hocussing with chloroform should take place unless supported by the testimony of a medical man, who has had *extensive practical experience* in the administration of that agent.

THE GREAT EXHIBITION.

The intimation published in our last number to the effect that the wholesale Druggists of London had abandoned the intention of exhibiting drugs, was received just at the time of going to press. It was believed at that time that the obstacle referred to was one which could not be overcome. This, however, was discovered, on further inquiry, not to be the case, and arrangements were made for carrying out the object. The collection will not be so extensive or so complete as we had originally anticipated, but it will comprise fair specimens of the most important drugs usually found in the London market. Other specimens of drugs will also be exhibited by foreign merchants, who have forwarded them to London for that purpose, and the comparison of these expressly imported specimens with those usually met with in our markets, may, probably, be a source of interest to some of the visitors to the Exhibition.

We have reason to believe that the exhibition of chemicals will be creditable to our British manufacturers.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

LIST OF MEMBERS, ASSOCIATES, AND APPRENTICES
(*Continued*).

ELECTED IN JANUARY, FEBRUARY, AND MARCH.

MEMBERS.

BIRMINGHAM	Christian, Francis	New Street
BRISTOL	Cuff, Robert C.	College Green
CROYDON	Meears, Job. Wm.	High Street
HOGSTHORPE	Braund, Edwin	High Street
LEWES	Figg, Thomas	High Street
LONDON	Greenwell, Baker	St. John's Wood
	Hargood, Wm. R.	Commercial Road
	Hopkins, Thomas B.	Tulse Hill
	Walker, Henry	35, Skinner's St., Somers Town
	Walton, George H.	43, Lamb's Conduit Street
	Williams, John	5, New Cavendish Street
LOWESTOFT	Chaston, Robert	High Street
MANCHESTER	Goadsby, Edward	Albert Place
	Hutchinson, James	1, Booth Street, Hulme
RUTHIN	Roose, Robert	Market Street
ST. ALBANS	Martin, Henry G.	Market Place
SHEFFIELD	Ward, William	24, Castle Street
SYDNEY	Alexander, James Lyon	
TORQUAY	Fisher, John T.	1, Lawrence Place

MAJOR EXAMINATIONS.

Baly, Nathan	Warwick
Fyfe, John Lawrence	Brighton
Groves, Wellington E.	Blandford
Higgins, Tom Sellers	Huddersfield
Mailloux, Auguste	Mauritius
Stocken, James	London

MINOR EXAMINATIONS.

Davidson, James	Newcastle
Dyson, William Bedford	Wakefield
Hunt, Richard Hunt	Winchester
Joy, Francis William	London
Langman, Peter	Chatteris
Metcalfe, Christopher Luccock	York
Parker, John	Reading
Reeve, Edward	London
Reynolds, Richard	Leeds
Roberts, Edwin	Trowbridge
Symonds, John Crane	Dudley
Towl, Edward	London
Watts, Henry Thomas	London
Whitfield, Henry	Worcester

REGISTERED APPRENTICES.

APPRENTICES.	RESIDING WITH	TOWNS.
Ball, Henry	Mr. Baldwin	Ironbridge
Bate, John	Mr. Lewin	Plymouth
Bennett, Richard M.	Ditto	Ditto
Brady, Henry B.	Mr. Harvey	Leeds
Brunton, Linton B.	Mr. Mabson	Yarmouth
Brumell, Henry B.	Mr. Challoner	Newcastle
Church, Henry	Mr. Binge	Westminster
Ford, Charles	Mr. Short	Reading
Fowler, Robert J.	Mr. Harvey	Leeds
Gilliat, William	Mr. Gamble	Grantham
Grimwade, Edward W.	Mr. Ridley	Ipswich
Harris, William H.	Mr. Watson	Cambridge
Hill, William R.	Mr. Tylee	Bath
Jessop, John	Mr. Deane	Clapham
Kent, William H.	Mr. Buck	Colchester
Longstaff, Joseph	Mr. Ritson	Sunderland
Maylett, Francis F.	Mr. Clift	Lewisham
Meek, John	Mr. Palgrave	Bedford
Morris, Thomas D.	Mr. Warburton	Farnworth
Newzam, Henry S.	Mr. Gamble	Grantham
Roulston, Benjamin W.	Mr. Chantry	Goole
Roust, George	Mr. Bolton	Tenterden
Sanders, Ernest	Mr. Gibbs	London
Scott, Walter	Mr. Cutting	Stowmarket
Shiston, William G.	Mr. Cross	Shrewsbury
Squire, William	Mr. Squire	London
Wadsley, George	Mr. Mills	Bourne
Watton, Edward	Mr. Holyoake	Manchester

PHARMACEUTICAL MEETING,

Wednesday, March 12th, 1851,

MR. INCE, PRESIDENT IN THE CHAIR.

DONATIONS TO THE LIBRARY AND MUSEUM.

The following donations were announced :—

Supplementary Observations on the Diffusion of Liquids, by Professor Graham, from the Author.

The London Medical Examiner, vol. i., from the Editor.

The Hunterian Oration, from the Author.

Twenty specimens of Dutch Cake Litmus, illustrating some of the varieties of this substance manufactured in Holland; Section of Cycas Stem, from Dr. Pereira.

Two Specimens of Chrome Iron Ore; Specimens of Sesquioxide of Chromium, Chromate of Potash, Bichromate of Potash, and Sulphate of Copper, from the President.

ARNICINA.

On the minutes of the previous meeting being read, Mr. Cobb requested that he might be permitted to supply an omission which he had unintentionally made in a quotation in his paper read at the last meeting. Referring to a substance eliminated by M. Lebourdais from *Arnica montana,* he had concluded that it was identical with the alkaloid extracted by Mr. Bastick, and described by him in his paper. He (Mr. Cobb) had taken the description of the substance obtained by M. Lebourdais from an abstract of the original paper, in which an important part of the sentence was omitted, namely, that the substance described was neutral. As Mr. Bastick's principle is alkaline and basic, they must obviously be different principles.

ON THE USE OF VOLATILE OILS IN MEDICINE,
AS ORDERED IN THE NEW DUBLIN PHARMACOPŒIA.

BY MR. INCE.

It is my object in the present communication to direct attention to some points relating to the use of volatile oils in medicine, which appear to have been overlooked by the authors of Pharmacopœias, and especially of the new Dublin Pharmacopœia.

The attempt which has been made in this last-named work to simplify the processes for the preparation of medicines, is, certainly, to be commended; but increased facility of production is not a sufficient recommendation to a process, if the quality of the product is, in consequence, necessarily deteriorated. I think I shall be able to show, that such deterioration results from some of the alterations introduced into the new Dublin Pharmacopœia, especially those relating to the preparation of medicinal waters, which are now directed to be made by the addition of alcoholic solutions of volatile oils to distilled water.

Some of the essential or volatile oils are included in the list of Materia Medica, at the commencement of the work above noticed, without any instructions being given as to the methods by which they are obtained. Of this number are the oils of orange peel and lemon peel, the oils of cajeput and turpentine, and the attar or otto of roses.

For the preparation of the others, the following general process is given:—

"The substance from which the oil is to be extracted is macerated for twenty-four hours, with five times its weight of water, in a sheet-tin or copper still, and, a condenser being then attached, half the water is drawn over by distillation, on the surface of which the oil will be found to float, unless (which is rarely the case) it should be heavier than water, when it will be found at the bottom of the receiver. The oil having been separated, the aqueous product, which is a saturated solution of the oil in water, is to be returned to the still, and the distillation resumed, and continued till the resulting liquid has the same volume as before. The oil is again separated, the watery product returned to the still, and the distillation resumed; and this process is to be repeated until it ceases to afford any additional oily product. The oil thus obtained is to be separated as completely as possible from water, and preserved in a well stopped bottle.

In this way volatile oils may be obtained from the entire herb of *Mentha piperita*, *Mentha pulegium*, *Mentha viridis*:

From the seeds or fruit of *Carum carui*, *Cubeba officinalis*, *Eugenia pimenta*, *Fœniculum officinale*, *Juniperus communis*, *Myristica moschata*, *Pimpinella anisum*:

From the flowers of *Anthemis nobilis*, *Lavandula vera*:

From the undeveloped dried flowers of *Caryophyllus aromaticus*:

From the tops of *Juniperus Sabina*, *Rosmarinus officinalis*:

From the bark of *Cinnamomum Zeylanicum*.

The water distilled over in the preparation of the several oils should be preserved for medical use."

Now, I think there are several parts of this process which are objectionable, and that the process, as a whole, is not calculated to yield the oils in the greatest state of perfection. Thus, for instance, the oils procured from the different species of Mentha will be inferior in quality if prepared from the dried plant, or from the *entire* fresh plant, as compared with those obtained from the fresh leaves and flowering tops. Maceration for twenty-four hours is quite unnecessary, and even injurious, in the cases of herbs and flowers, and it is scarcely required for seeds or fruits, and barks, excepting, perhaps, for cubebs, nutmegs, and cloves. The practice of returning the water which first distils over, and from which the supernatant oil has been separated, to the still, to be made again the vehicle for carrying over more oil, is objectionable, for although the product may be thus increased in quantity, the flavour of the oil will be deteriorated. Moreover, the water, distilled over in the preparation of volatile oils, and especially if returned to the still during the process, is not fit for medicinal use, as it is generally highly charged with vegetable matter, which gives to it a rank disagreeable taste.

But even when the volatile or essential oils are obtained under the most favourable circumstances, and in the greatest state of perfection, they do but imperfectly represent, medicinally, the substances from which they are derived. Thus, the essential oil of cubebs does not contain the essential or active medicinal constituents of the cubeb; nor does the essential oil of cinnamon represent the carminative properties of the bark. Some of the oils differ in properties according to the temperature at which they are distilled, and two or three varieties of oil may sometimes be obtained from the same substance at different stages of the distillation. The volatile oils usually met with in commerce are often deficient in fragrance, and always subject to a slow but progressive change which they undergo in contact with the air. Thus, the fragrant oil of juniper degenerates into a kind of turpentine; oil of fennel is almost always empyreumatic; oil of nutmeg soon loses the delicate flavour of the nut; oil of cinnamon becomes converted into cinnamic acid; and oils of caraway and chamomile generally bear evidence of the effects of oxidation from exposure to the air, or of their having been prepared from the herbaceous parts of the plants instead of the seeds or flowers. I am informed that large quantities of oil of caraway are distilled from the flowering tops of the plant; and it is well known that in distilling oil of chamomile the entire plant is generally used.

The volatile or essential oils enter into the composition of many of the preparations ordered in the Dublin Pharmacopœia, including liquor arsenicalis, some of the confections, mixtures, and pills, the essences, two of the tinctures, and lastly the medicinal waters. In many, if not most of these cases, it may be doubted whether the object obviously contemplated by the use of these oils might not have been otherwise more satisfactorily attained. Thus, for instance, in the confections, cloves, fennel seeds, and caraway seeds, would probably be more efficient and not less eligible, than the volatile oils of these substances. In the pills, it would perhaps have been better to have left any volatile oils to be ordered by the prescriber, as the presence of a particular oil sometimes renders a pill-mass inapplicable in cases where it would otherwise be suitable. The essences are, I think, in some respects, convenient preparations, tending to facilitate the administration of the volatile oils in cases where their use may be particularly indicated; but the application of these essences for the preparation of medicinal waters, without distillation, is decidedly objectionable.

The distilled waters of our Pharmacopœias are by no means unimportant preparations, and their efficacy depends, in great measure, upon their containing the volatile oils of the substances from which they are made, uninjured by the causes to which I have already referred. They should be grateful to the stomach, and always free from rank flavour. Their preparation and preservation have often been found to involve some trouble and difficulty, and hence, probably, the attempt made by the Irish College to simplify the process for making them. The addition of a few drops of volatile oil dissolved in spirit to distilled water, is a very easy process as compared with that of distillation from the plant, or its seed, flower, or other part; but the products of the two processes are entirely different. These differences will be abundantly evident on examining the specimens which I have laid on the table, consisting of waters carefully prepared by distillation in the old way, and the corresponding waters made by the Dublin process. In every respect the latter are decidedly inferior to the former. Thus rose-water, made by the Dublin process, by adding twenty minims of otto of roses to half a gallon of distilled water, shaking them together, and then filtering through paper, is a miserable substitute for the fragrant and agreeable water distilled from the fresh petals of the rose. The same may also be said of the other waters which are directed to be made by adding solutions of the essential oils to water. Caraway and fennel water made in this way are subject to the objection which I have already mentioned as attaching to the volatile oils of caraway and fennel. Cinnamon water made in the same way can hardly be recognized by its smell, and after being kept for a short time will be entirely devoid of the peculiar flavour of cinnamon. The waters of the different species of mint are much less grateful, and I believe, also, less efficacious, medicinally, when prepared in this way, than when carefully distilled from the herb. They are also much more subject to decomposition, and soon become worthless. In fact I may say, that the alteration alluded to in these processes is, essentially, a retrograde movement, tending to bring a valuable class of medicinal agents into undeserved disrepute.

The difficulty which has been experienced in the preparation and preservation of the distilled waters made in the old way, has arisen from the non-observance of a few simple, but very important points. Due care having been taken in the selection of the vegetable substance, from which the water is to be distilled, which is quite as necessary in this case as in the preparation of volatile oil, the water should be carefully drawn over, not too rapidly, nor with an unnecessarily large proportion of vegetable matter. The object should be to get the water saturated with the most volatile of the constituents of the vegetable substance operated upon, without exposing these constituents to more heat than is necessary for their volatilization, or to prolonged contact with air. The distilled water should be separated as completely as possible from any portion of undissolved oil before it is put away for preservation. This I consider to be a very—perhaps the most—important point in connexion with the preservation of the water. It is well known that all the essential oils are subject to changes when exposed to the air, and these changes appear to be accelerated under the joint influence of air and water; so that no condition could be more favourable for promoting change in a volatile oil than its diffusion in a thin stratum over the surface of water to which atmospheric air has free access. Waters that are thus exposed sometimes become thick and ropy, and they very speedily lose the peculiar flavour which in the first instance they had acquired from the vegetable substances with which they were distilled. Now this change certainly originates in the undissolved oil, which, floating on the surface, becomes converted into a substance either soluble in the water, or specifically heavier than it, so that falling through the water it communicates the change which exposure to the air has set up in it, to the portion of oil dissolved in the water. That this is the case is evident from the fact, that when the water is separated from all the undissolved oil, it may be kept perfectly good for years, although in other respects the conditions to which it is exposed remain unaltered.

The only further point that seems to require notice in reference to the preservation of distilled waters, is that they should be kept in vessels the mouths of which are slightly closed, so as to exclude dust, and to prevent a free interchange of air with the outside. Long experience has proved that the waters keep much better in this way than when contained in closely-stopped or in wholly unstopped vessels.

31, *Southampton Street, Covent Garden.*

Mr. Redwood inquired whether Mr. Ince thought that redistillation was always injurious in the preparation of medicinal waters. He knew some Pharmaceutists, who were very particular in the preparation of their distilled waters, and who considered in certain cases that redistillation was beneficial. Elder-flower water was one of those which it was often found difficult to keep good. It frequently became thick and ropy, and lost the peculiar smell of the elder-flower; and it had been suggested that this change might, to some extent, be prevented by carefully distilling the water a second time with the addition of a smaller quantity of flowers than were used in the first distillation.

The Chairman thought that redistillation always produced an injurious effect. The water might, it was true, be rendered more free from mucilaginous matter by this means, but it would also lose some of its true flavour. In redistilling a medicinal water, not more than half the quantity introduced into the still could be drawn over so as to retain the original strength, and even this would be found to be less delicate in flavour than that first distilled, if the precautions to which he had alluded in his paper were duly attended to.

Mr. Bell had found that by redistilling oil of lavender which had been injured by keeping, and adding a small quantity of fresh flowers to it in the distillation, the quality of the oil was restored so as to be nearly equal to ordinary new oil. He had also obtained very good oil of peppermint, by distillation, from the carbonate of lime which had been used with oil of peppermint for making peppermint-water. A large quantity of this carbonate of lime had collected at the bottom of the vessel in which the water had been made, and on submitting it to distillation, about a pound of excellent oil was recovered.

The Chairman observed, that some years ago, when the cholera prevailed in this country, several attempts were made to give foreign oil of peppermint the character of the English oil, by distilling it with some of the herb grown in this country, but the result had been a total failure. Although oil which had become partly oxidized from exposure to the air might be improved by distillation, the unaltered part being the most volatile, and therefore that which would pass over in the process, while the resinified portion would be left behind, yet he did not think it possible that the oil could thus be made better than it was when first prepared.

Mr. **Bastick** thought the effect of redistilling an essential oil would be twofold. Any portion of resin which had been formed in the oil would be left behind, and thus separated from the oil, which would pass over, and to this extent the oil would be purified. But as all the volatile oils are very susceptible of oxidation, the vapour of the oil being brought into contact in a diffused state with the air contained in the still, further oxidation would be thus promoted, and to this extent there would be further loss. It had been suggested by some high authorities, including Professor Liebig, that the aroma of the essential oils was due to a slow process of oxidation, in support of which view it was asserted that oil of turpentine, when distilled in an atmosphere containing no free oxygen, was entirely deprived of its peculiar flavour.

LINIMENTUM SAPONIS.

Mr. **Jacob Bell** requested permission to read an extract of a letter, which he had received from Mr. Goodall, of Market Drayton, relating to a preparation in the Pharmacopœia, showing the necessity of practical experience in pharmaceutical manipulation as well as medical knowledge in the compilation of that work:—

"Having fallen into a dilemma in consequence of a scrupulous adherence to the rules laid down in the Pharmacopœia, rules which (not only for the sake of uniformity in dispensing, but in order that the intentions of the prescriber may be fully realized) should be faithfully carried out, I am induced to apply to you for advice. A prescription was brought to me thus:

℞ Lin. Saponis, ʒiss.
Tinct. Opii, ʒss. ♏.

"I dispensed it with preparations made strictly according to the Pharmacopœia. I received a communication stating, that it was unlike that previously made up at another shop. I expressed confidence in my own accuracy. The two liniments were submitted to the Physician's inspection, when that made up with the fluid Lin. Saponis was pronounced 'right,' and mine, which would not *pour* out of the bottle, 'wrong.'

"Finding, as I have since done, that many Chemists for the sake of convenience both in dispensing and use, have made a deviation from the directions of the Pharmacopœia, I cannot wonder at this decision, nor would it be an easy matter, at a cursory glance, to discover that the Lin. Saponis employed in making the fluid liniment was made with soft soap and a spirit underproof, while that in the more solid form contained pure Spanish soap and spirit fifty-six overproof.

"At the time of this occurrence I was not aware that the mode of preparing Lin. Saponis had been the subject of papers read at two or three meetings of the Pharmaceutical Society; that the writers deemed it desirable that it should be so prepared as to retain a fluid state at all temperatures, and that to arrive at this result a slight deviation from the Pharmacopœia was suggested, if not recommended. Had, however, the papers read on these occasions come under my notice, I do not know that I should, consequently, have adopted any alteration in the absence of a well-understood agreement that it was to be considered a rule of universal application—a result which, of course, the writers could not ensure.

"I have, in all cases on being the first dispenser of the prescription, used the solid Lin. Saponis, and in several instances, when following London establishments of high standing, have found that the same had been employed by them.

"I lay these particulars respectfully before you to show the jeopardy in which the reputation and business of scrupulous parties may be placed, and cannot but express a hope, in which I know you will join, that the new Pharmacopœia, which is expected shortly to come out, will not contain any form from which it may be thought either expedient or desirable to deviate."

Mr. Bell remarked, that the preface of the Pharmacopœia sanctioned deviations from some of the processes given, *provided the desired result were produced.* In the present case the preparation was not minutely described, but it was generally understood that a liquid, and not a solid liniment, was intended; the only deviation required for the purpose was the reduction of the strength of the spirit to that point at which it would dissolve the soap, not the substitution of soft soap for hard. As a confirmation of the belief that the College intended the liniment to be liquid, he mentioned the fact, that in the new London Pharmacopœia, about to be issued, the requisite alteration had been made.

Mr. DANIEL HANBURY observed, that it was formerly the practice to keep two kinds, the solid and the liquid.

RED AMORPHOUS PHOSPHORUS.

MR. REDWOOD read an extract from a letter from DR. DE VRY, of Rotterdam, addressed to DR. PERCY, of Birmingham, which the latter had sent for communication to the meeting, as it related to some remarks originally published in the Pharmaceutical Journal.

Rotterdam, February 28, 1851.

"DEAR PERCY,

"Some days ago I read in an English journal a report of the Third Annual Meeting of the Birmingham Pharmaceutical Institution, on the 18th of October, 1850, in which you have said, that it would be interesting to ascertain the physiological effects of the allotropic phosphorus. On reading this I resolved to communicate to you a very interesting experiment which I made some time ago upon this subject. Knowing that the ordinary forms in which phosphorus is used in medicine are very unsatisfactory, I thought that the red modification would, perhaps, answer better for medical use. I administered, therefore, to a small dog 0.1 gramme of allotropic phosphorus to test its physiological effects; but none were observable. I now doubled the dose, but with the same negative result. I continued to increase the quantities, until at last I gave three grammes (46.3 grains) in one dose. The animal remained, nevertheless, in perfectly good health. I only observed that the fæces had a somewhat red colour, which fact induced me to investigate if they contained allotropic phosphorus. The fæces were therefore dried and treated in a glass tube with chlorine gas. I obtained chloride of phosphorus, which was decomposed by water, and the liquid was found to contain a large quantity of hydrochloric and phosphoric acids, the products of the decomposition.

"If you practical English can find an easy method of converting the ordinary phosphorus into the red amorphous kind, then the manufacture of lucifer matches may be rendered as harmless as the manufacture of sugar."

ACTION OF THE PREPARATION FOR MARKING-INK ON LINEN.

A PIECE of linen, which had been marked with marking-ink requiring preparation, was submitted to the Meeting, having been sent to the Society by Mr. Alexander Reid, of Bathurst Street, in consequence of the following phenomenon having been observed in it. The linen, which was made into a glass-cloth, was marked in the usual way, the spot about to be written upon being first wetted with a weak solution of carbonate of soda, containing two ounces of carbonate of soda in a pint of water, which was thickened with a little gum, and coloured with carmine. The cloth, together with others marked at the same time, had been in use for several years, and nothing particular was observed, excepting that the part to which the "preparation" had been applied had a darker colour than other parts, and this darkened colour it still retained although it had been so often washed. Within the last few months it had been observed that a remarkable kind of decay was taking place in the part of the cloth to which the preparation had been applied. Along the margin of the spot which had been wetted with the preparation, and nowhere else, the cloth became disintegrated, presenting in the first instance a somewhat similar appearance to that of woollen cloth which has been moth-eaten, and ultimately this portion of the cloth separated from the rest, leaving a hole the exact size of the spot to which the preparation had, some years ago, been applied.

LIVERPOOL CHEMISTS' ASSOCIATION.

DURING the month of February Mr. H. S. EVANS, F.C.S., delivered a course of lectures before the Society on "Chemical Affinity," which were ably illustrated by diagrams and experiments.

The usual monthly meeting was held on Friday evening, March 14th, the PRESIDENT in the chair, when Mr. W. JOHNSON, F.C.S., delivered an interesting and able lecture on "Heat," in which he considered especially the effects of solar heat in the animal, vegetable, and mineral kingdoms.

Mr. J. B. **Edwards** stated that the Royal Insurance Company, with whom he had been insured two years, had refused to renew the policy in consequence of his making small quantities of gun-cotton on the premises for the preparation of collodion, although accident from explosion is always excepted in the liabilities of an insurance office. This company would not insure the stock *at any rate*, while gun-cotton was kept or made on the premises. Mr. **Edwards** removed the policy to another office, where the insurance was effected at the usual rate, with a proviso that this process should be allowed; and he mentioned the circumstance in order that those who were in the habit of making small quantities of gun-cotton for this purpose, should have a proper understanding with their insurance office, as otherwise their policies might be invalidated.

ORIGINAL AND EXTRACTED ARTICLES.

COPROLITES, OR FOSSIL MANURE.

BY MR. ISAIAH DECK.

From the many inquiries I have recently had respecting the "diggings" at Barnwell, and the repeated specimens I have received from various localities, of these nodules for information as to "what they were," I am induced to trouble you with a few observations on these remarkable productions of our strata. The extraordinary deposit of these curious substances, whether from the abundance in which they are found, or that they should at this remote period contain almost all their original organic matter, considering the countless ages they have remained buried, must be a matter of astonishment to all reflecting minds; but now that they are becoming a considerable article of commerce, it is a matter of interest to those who possess them on their lands, and to whom they now probably pass unheeded as common debris, or gravel fit only for road mending. I have no doubt that wherever there is an out-cropping of the upper green sand (the stratum in which they are found)—and it extends a considerable distance around Cambridge—that there these peculiar nodules may be met with. And this, the surface-bottom of an ancient deep sea, appears to have been the receptacle of the bones and fæcal matter of its inhabitants for a long period, which matter is now, by the united penetrating researches of the chemist and geologist, brought to light, as containing the fertilising principle and pabulum of vegetable life, verifying the great axiom of chemistry, that nothing is lost in organic atoms, and that the refuse of former ages in an indirect manner produces the gold of the present.

The parish of Barnwell contains an extensive area of these coprolites or fossil dung. In a field near the railroad-bridge, the upper green sand appears on the top of the gault, varying from eighteen inches to six feet below the surface, and from six to twenty inches in thickness: over this is a mortar-looking conglomerate, resulting from the debris of denuded chalk, from which these substances are now being raised in considerable quantities; where the depth from the surface is greatest, there the deposit also appears to be greatest. For years the article now so much sought after has been the bane of the brickmaker, and tons have been thrown into old excavations to get them out of the way as useless rubbish, while from £60 to £80 have now been given for liberty to dig over a two-acre field. From the railroad to the opposite side of the river at Chesterton they may be traced, and to a considerable extent on both sides of the river to Horningsea, where, I understand, diggings are going on.

From Denny Abbey across the county to Cottenham Common, the green sand crops out; and although it varies in geological position, it may be well for those interested to examine if it does not contain these coprolites. On the west side of this town they may be found in considerable quantities lying upon the surface; the fields on each side from the Barton road to Grantchester abound with them; and they are probably to be met with between this point and the escarpment of the chalk at Orwell, but which beyond the turnpike I have not investigated. On examining a field of potatoes in the parish of Wimpole, to trace the disease, I was struck with astonishment at the extraordinary quantity abounding on the surface there. Beyond this, the diluvial patch of clay that covers the chalk cuts off all geological probability of finding them.

The appearance of these nodules is in shape various; generally a hard, black, water-worn looking stone, with excrescences; some with convoluted marks, bearing the impress of the intestine, and rounded off at the extremities—the surface of all exhibiting lines from the decomposition of its more destructible component parts. Portions of coral, ammonites, crustacea, sponges, &c., may be found in the agglutinated mass. They vary in size from a small bird's egg to masses the size of a fist. A large selection from our own, as well as from distant localities—the lias of Lyme, the chalk of Farnham, the slate of Newhaven, and the crag of Suffolk—I have open for the inspection of those interested.

The process which they go through to render them available for use may not be out of place. After being selected from the soil, they are well washed by rotatory machinery erected on the spot, and then conveyed by rail to the manufactory, where they are ground to a very fine powder, an operation, from their hardness, of no small difficulty, vertical granite and buhr stones being required. The powder is mixed with about an equal portion by weight of strong sulphuric acid, by the action of which it is reduced to the state of a superphosphate, and is thus sold under the name of Coprolite and Acid. This is, I believe, part of the process used in the manufactory of Mr. Lawes, who produces a very superior article, and to whom we are much indebted for his early attention to supply the increasing demand for phosphates as artificial manure, and who has been supplied with thousands of tons from digging over a four-acre field at Walton, in Suffolk, the subsoil of which was crag, producing to the farmer a much richer harvest than grain at the present free-trade prices. In an article, varying as it necessarily must from extraneous matter, the component parts materially differ. The following analysis may be taken as an average of their composition, 100 parts containing

Earthy phosphates	61
Carbonate of lime and iron	24
Insoluble	12
Moisture	3
	100

Mr. Lawes, from a sample from the same locality, made seven parts more phosphates, and Mr. Potter four less than the above analysis of my own.

There is a prevalent idea that these coprolites are almost the same as guano; this is a great mistake; for although our own production yields a larger proportion of the phosphates, it is devoid of salts of urea and ammonia, which, in combination with the phosphates, increase to a considerable extent the fertilising principle for which that foreign article is so celebrated. It has been the object of artificial manures to supply synthetically the composition of guano at a much reduced rate.

In respect to the value of coprolites in our locality, besides giving employment at this season to many idle hands, a bonus has been given for the right of royalty over the soils, and 5*s.* per ton is paid the proprietor for all raised. This, with labour, washing—a troublesome and tedious process—and rail charges for delivery in London, costs from 35*s.* to 40*s.* per ton.

To show the comparative value of the different substances containing the phosphates, and that of guano, an analysis of a good sample is here given, and that of the phosphates and carbonate of lime in various bones. That portion contained in the fossil remains of bone and coprolite is a beautiful illustration of the goodness of the Great Author of Nature;—remains which, after being interred thousands of years, are by the labours of man brought again into action, that their elementary parts may be again separated and made subservient to his uses.

Analysis of Guano from Peru.

Urate and salts of ammonia	34.05
Various phosphates	37.04
Carbonate of lime	1.65
Soda and potash	8.92
Silex	4.28
Water and indefinite organic matter	14.06
	100.00

Comparative Analysis of Bones.

	Phosphates.	Carbonate of Lime.
Recent human bones	81.09	10.03
Ancient ditto, from Roman tumulus	76.38	10.13
Fossil bone from the Crag	60.02	18.00
Recent ox bones	57.35	3.85
Sheep bones	80.00	19.03
Bones of the hen	88.09	10.04
" frog	95.02	2.04
" fishes	91.09	5.03

King's Parade, Feb. 20, 1851. *Cambridge Chronicle,* March 1.

MANUFACTURE OF SULPHATE OF COPPER.

The commercial manufacture of sulphate of copper and, the apparatus employed, is very simple. In a wooden vessel lined with stout sheet-lead, a certain quantity of oil of vitriol is introduced, to which copper scales are added, until a saturated solution of sulphate of copper is obtained, the operation being assisted by the aid of steam, blown in through a lead pipe dipping to the bottom of the vessel; the mother-liquor of a previous operation is then added, and the whole set aside to crystallize. The crystallizing vessels are of wood lined with lead. These are placed in a warm room, and a crop of crystals is usually obtained in the course of four to six days. The mother-liquor being poured off, the crystals are placed in the drainer, after which they are dried, and packed in casks for sale; or, what is of more frequent occurrence, taken from the drainer whilst still damp, and in that state packed for sale.

The copper scales above mentioned consist of a mixture of metallic copper with oxides of that metal, and are obtained in the form of thin plates or scales from the sheets of copper which have undergone the process of annealing, by being heated in a furnace or forge. A portion only of these scales are dissolved by the sulphuric acid; the residue is therefore washed, dried, and sent to the copper furnace to be melted. The following shows the result of two operations on a commercial scale.

First Operation.—5 cwt. 2 qrs. of copper scales, 685 lbs. of sulphuric acid, sp. grav. 1700, and a sufficient quantity of water, produced 5 cwt. 2 qrs. 24 lbs. of crystallized sulphate of copper; also 122 gallons of mother-liquor, sp. gr. 1180, and 160 gallons of ditto, sp. gr. 1100. A certain quantity of sulphate having been obtained from a given number of gallons of each of the mother-liquors, the total produce of sulphate of copper was estimated at 1240 lbs. 2 cwts. 1qr. 8 lbs. of insoluble copper remaining.

Second Operation.—Copper scales 7 cwt., sulphuric acid, sp. gr. 1700, 800 lbs., water, q. s., produced crystallized sulphate of copper, 7 cwt. 1 qr. 14 lbs.; 138 gallons of mother-liquor, sp. gr. 1176, and 116 gallons, sp. gr. 1080, total crystallized sulphate of copper was estimated (in the same manner as in the first operation) at 1651 lbs.; the quantity of insoluble copper residue being 2 cwt. 3 qrs. 18 lbs. In these experiments, water was used instead of the mother-liquor of a previous operation, the object being to ascertain the exact amount of salt obtained from a certain quantity of copper scales.

A not unfrequent custom in the manufacture of sulphate of copper is the addition of the "pickle," or "dipping-liquor" of the coppersmith and brazier, to the solution of copper in sulphuric acid abovementioned, and in some cases the pickle or dipping-liquor alone is employed to furnish crystals of this salt, the excess of acid being neutralized with oxide of copper.

The pickling or dipping process consists in the immersion of copper, brass, and other metallic alloys in an acid solution, for the purpose of removing the film of oxide with which the metal has become covered, and which oxide must be removed in order to render the metallic surface sufficiently clean for the reception of varnish, lacquer, or other finishing, as well as also for the coating of the surface of one metal with another.*

There could be no objection to the use of this pickle or dipping-liquor, if copper articles alone were immersed in the acid; but as articles formed of brass and other metallic alloys are also dipped in the same pickle, the sulphate of copper thus obtained cannot be pure. Again, a mixture of nitric and sulphuric acid is sometimes employed, constituting another source of impurity.

In Birmingham, some hundred tons of dipping-liquor are annually made, and employed in the manufacture of sulphate of copper; the consequence being that the sulphate contains a large portion of zinc, which may sometimes be seen in the form of slender white needles on the surface of the dark blue crystals. Nickel, lead, arsenic, and antimony are sometimes present in the so-called sulphate of copper, manufactured either partly or entirely from the pickle or dipping-solution.

In addition to its medicinal uses, this salt is extensively applied in the arts, particularly in the manufacture of Scheele's or emerald green, and other pigments. Large quantities of sulphate of copper are also disposed of in the autumn and spring in the agricultural districts, it having been found that seed-corn steeped in a solution of this salt previous to being sown, is an effectual remedy against the disease of wheat called the "smut."

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* In the tin-plate works, large quantities of sulphate of iron are obtained by the evaporation of the pickle in which the iron plates are dipped for the purpose of cleansing them, previous to their immersion in the bath of melted tin.

The impure sulphate of copper before mentioned, which is sold at 4*s.* to 5*s.* per cwt. below the price of good sulphate, will do very well for agricultural purposes, but as sulphate of zinc is not equally efficient for preventing the smut, the farmer must employ a larger quantity of the impure salt to effect the desired purpose, and thus gains nothing from its use. The *very impure* sulphate of copper is of a much lighter colour than the genuine salt. Sulphate of copper from sources likely to be dashed with the contents of the pickling or dipping-pot, should at all times be viewed with much suspicion.

ON THE MANUFACTURE OF SMALT.

BY MR. CHARLES TOMLINSON.*

In offering my acknowledgments to you for the honour you have done me in electing me a member of this institution, I think that I cannot show my gratitude better than by contributing something, however small, to your stock of information. I should, however, despair of being able to do this, if the subject of this evening's paper had reference to our own native arts and manufactures, for I shall not be taking too much for granted, if I assume that an institution, which, by its position and resources, is so well calculated to be the exponent of British industry, must be well informed respecting the raw materials of the British islands, and the processes by which value is conferred upon them, or upon the materials of other lands through our own native resources.

The branch of manufacture to which I have to invite your attention is entirely foreign. I think I may safely affirm that the blue colour which is so extensively used in painting and varnishing porcelain and earthenware, for tinging crystal and for enamelling, for imitating opaque and transparent precious stones, for imparting a magnificent blue to glass, for giving a blue tint to writing-paper and to linen, for fresco painting, for the blue figures which adorn paper hangings; — that the blue colour for these and for various other useful purposes in our arts and manufactures is almost entirely obtained from two small districts, one in Saxony, on the borders of Bohemia, and the other in Norway, while the processes by which it is produced are, many of them, so exceedingly curious and instructive, that I really do not think the time of the meeting will be occupied altogether in vain, if we attempt to describe them somewhat minutely.

In the autumn of 1847 I ascended the beautiful valley of the Elbe above Dresden, into the Saxon Switzerland; and, climbing one of the commanding eminences of the place, I came suddenly to a point, where lay at my feet, spread out like a green ocean, an extensive pine forest, from which here and there curled up in a picturesque manner the blue smoke of the charcoal burner. In the distance lay the boundary mountains of Saxony and Bohemia, the Erzgebirge, famous for their mineral riches, and equally famous for the reputed hosts of spirits, of gnomes, and of KOBOLDS, which are said still to watch over the concealed treasures of the district. These presiding genii, however, did not refuse to reward the toil of the miner with rich ores of silver, copper, and lead; but as the gnomes and dark spirits are known to be capricious in bestowing their favours, the miner has not always been equally prosperous. Towards the end of the fifteenth century the rich ores with which he had long been favoured gradually became poor: the miner worked on in vain, his labour was fruitless; he brought up an ore which injured his health by its arsenical fumes, and yielded nothing to the smelter but a powder of a reddish brown colour. The rich ores had been changed into rubbish by the evil genii, the KOBOLDS or *goblins* of the mine, and then it was that the poor miner sought for and obtained the intercession of the Church, which from that time included in her services a petition for deliverance "*from all Kobolts and spirits which injure the miner.*"

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* Read before the Society of Arts, London, 5th March, 1851, and communicated by the Author.

But in this case, as in many others, the answer to prayer was given in a manner wholly unexpected by the petitioners. The poor miners of Schneeberg, who had suffered most from this transmutation of their rich ores into base *cobalt* (as they nicknamed them after the name of the fiend) were destined to be relieved from their perplexity, and to see the despised cobalt become a source of wealth far greater even than the rich ores whose loss or deterioration they so much deplored. It is related that one Christopher Schurer, a glass-maker at Platten, a place which still belongs to Bohemia, retired to Neudeck, where he established his business. Being on one occasion at Schneeberg, he collected some of the coloured pieces of cobalt ore and tried them in his glass-furnace. Finding that they melted, he added some cobalt to glass, and, to his delight, obtained a fine blue glass. This was about the year 1540, or perhaps earlier. This Christopher Schurer was a man of genius; his observation that cobalt gave a blue colour to glass did not rest with him as a solitary unprofitable fact; he immediately began to see in what way he could apply it to useful purposes. Doubtless, after many trials and many failures—for that seems to be the natural progress of advancing knowledge—he met with one great success. He succeeded in making of this blue glass an *enamel colour* well adapted to the use of the potter. In the course of time the colour became an article of merchandize in Nuremberg. From this place it found its way to Holland, where painting on glass was much cultivated, and the Dutch artists were not slow in appreciating the value of a substance capable of imparting to glass a magnificent blue colour, and remaining *permanent in the fire*, under the most intense temperatures which the glass-burner was accustomed to use. Our humble glass-blower of Neudeck now became an object of courtly attention on the part of some of the magnates of Holland. They sought him out, and invited him to reveal his secret. They made large promises to him, and at length succeeded in getting him to remove to Magdeburg, where he made glass from the cobalt of Schneeberg. He appears, however, to have become tired of his residence in Magdeburg, for we find him again at Neudeck, where he constructed a hand-mill for the purpose of reducing his glass to powder, and he afterwards erected one which was driven by water. At this period the manufacture must have been tolerably successful, for the colour was sold at 7½ dollars (22*s.* 6*d.*) per cwt., but in Holland the price was from fifty to sixty florins (100*s.* to 120*s.*) per cwt. This advanced price seems to confirm the statement that the Dutch had so far profited by the instructions of Schurer as greatly to excel the Saxons in the preparation of the colour. The dressed and roasted ore was sent in casks from Schneeberg to Holland, and the Dutch article was soon preferred. The Elector of Saxony, on the representations of the people of Schneeberg, sent to Holland for two colour makers to give instructions in the art, and advanced 1000 florins by way of premium for the same. Some success seems to have attended this plan, for we find soon after that colour-mills increased in number in the neighbourhood of the cobalt mines. Mention is made of an ingenious man named Paul Nordhoff, who impoverished himself by a long course of experiments undertaken with a view to improve the colour, and was compelled to quit Zwitter-mill, where he had been engaged for ten years in its preparation. He retired to Annaberg, where, in 1649, with the assistance of a Leipzig merchant, he became director of a colour manufactory, and thus rendered the Annaberg cobalt an article of value.

I am not able to trace the history of this blue colour with sufficient minuteness, to be able to show who was the inventor of the processes as they are now practised. If it were possible to do so, it would doubtless be found, that like all those useful arts which have preceded science, success was attained after numerous failures; many individuals were in the field, I cannot say of research, but rather of random experiment; some lucky hit stood in the place of scientific induction; and thus each individual manufacturer had his own favourite recipe, which for a time was kept secret; it was the "art and mystery" of his occupation, not to be exposed to vulgar gaze, and only to be revealed for a consideration. Commerce appears to have recognized many distinctious in this colour, according to its depth, intensity, tone, or shade, and to have applied certain letters and numbers to distinguish them, which letters and numbers are still retained. By degrees the processes of different manufacturers became absorbed into one manufacture, in which the good was retained, the superfluous rejected; and this beautiful colour continued to be manufactured for a very long period from a mineral, the composition of which was unknown. It was not till the year 1733 that the Swedish Chemist Brandt obtained from this ore the metal which he called *cobalt*, and proved that the colouring matter is the protoxide. In 1780, Bergman confirmed and extended Brandt's results. In 1800, the School of Mines at Paris instituted a set of experiments with a view to obtain the pure metal. In 1802, Thénard published an investigation which threw considerable light on its combinations with oxygen; and in 1806, Proust published a set of experiments on the same subject.

I need not detain you with any account of the methods of obtaining metallic cobalt. It has not been applied in the arts, and the interest which attaches to it is purely scientific. It is a brittle metal, of a reddish grey colour; it fuses with difficulty: its specific gravity varies (probably according to its purity, and it is very difficult to obtain it pure) from 7.7 to 8.7. Its symbol is Co, and its combining weight is 30. These specimens of the pure metal were lent to me by Professor Miller, of King's College. You see that cobalt is magnetic by its hanging about the pole of a magnet, and the small dust of cobalt stands bristling out as we see steel filings behave under similar circumstances.

The native combinations of cobalt are the oxide and compounds of the metal with iron, nickel, arsenic, and sulphur. In the white and grey cobalt ores the metal is combined with iron and with arsenic. The ore called *glance cobalt*, from Tunaberg, in Sweden, is a sulpho-arseniuret of cobalt. Some of the varieties are crystallized in cubes, octohedrons and dodecahedrons. The red ore is an arseniate, the finest specimens of which are produced in Saxony. Cobalt has also been detected in meteoric iron. The specimens of cobalt ore on the table have been lent by Professor Tennant, of King's College.

The most important mining centre of Saxony is Freiberg. This interesting town contains the celebrated School of Mines (Berg Academie), to which students repair from all parts of the world for instruction in the art of mining. There are professors of geology and mineralogy; professors both of the practice and the theory of the art of mining: first-rate instruction is given in surveying, mining, and in the preparation of the ores, &c. The museum of the school contains a splendid collection of the mineral productions of Saxony, together with models of the mines, and the machinery used in raising and working the ore; hydraulic machinery, &c. This latter has been carried to great perfection, and has hitherto rendered the introduction of the steam-engine unnecessary, or at least, not desirable. It may appear strange to an Englishman, who is of course a disciple of Boulton and Watt, that in this celebrated mining centre, the steam-engine is practically unknown. Its absence appears still more remarkable, when it is considered that the facilities for water power are by no means great at Freiberg. In the mine which I descended, the water power was a small brook, whose natural course was several miles distant, but which had been diverted into an artificial channel, and made to pass in wooden troughs a few feet below the surface of pastures and arable lands, until arriving at the mine it was skilfully distributed as a moving power above and below ground.

In the neighbourhood of Freiberg there are upwards of a hundred mines of silver, copper, lead, and cobalt; the prevailing rock is a primary gneiss. A mine cannot be visited without a pass or permit, the *fahrschein*, as it is called, which is obtained from the Bergmeister in Freiberg, on payment of a fee, which is applied to a fund for the relief of sick or decayed miners. Some of my auditors may perhaps be curious to see a German fahrschein—here is the one which I obtained on my visit to the *Himmelfahrt*.

The miners of the Saxon Erzgebirge, or ore-mountains, retain some peculiar customs; their salutations in the street and to each other, vary with the hour of the day and the proceedings of the mine: they form a sort of semi-military corps, of which the common workmen are the privates, and the superintendents and managers the officers. They are called out several times in the course of the year, and also assemble on special occasions, such as attending miners' prayers in the church, or the funeral of a superior officer, during the visit of a royal personage, and on days of rejoicing for the discovery of a rich vein. On these occasions they appear in uniform, wearing leathern aprons behind, and not before, with leathern pockets in the place of cartouch boxes, and a large knife stuck in the girdle. The common miners march with their pickaxes shouldered, the carpenters with their axes, and the smiths with their hammers. These processions are headed by a band playing a miner's march, and accompanied by flying colours. The hinder apron of the miner demands special notice. It is always worn by him, whether in his working or in his holiday dress. Even the chief, or Berg-Hauptman wears it; and the King of Saxony, were he to visit Freiberg, must, as the head minor of Saxony, adopt this singular appendage. There is only one occasion when the miner does not wear it, and that is when he is disgraced, when having committed some crime, or done some act which has been judged unworthy of a man, he is solemnly deprived of his apron: from that time forward he ceases to be a miner, and is for ever debarred from sharing in the dangers and participating in the honours and the pleasures of his class.

The miners are divided into three gangs, each working eight hours underground. Before going down, half an hour is devoted to religious exercises, in which some of the beautiful hymns of the Lutheran Church form a prominent part. The deep impression which the reformed faith of Germany has made upon these simple miners, is conspicuous even in the very names which are applied to the mines and to the veins or lodes of ore. Thus to select a few of the names of mines we have the *Prophet Samuel*, the *Prophet Jonas*, the *Palmbaum*, the *Jung himmlisch Heer*, the

Sonnen und Gottesgabe, the *Vertrau auf Gott*, the *Himmelfahrt sammt Abraham*, the *Hütte Gottes*, the *Alter Morgenstern*, the *Neuer Morgenstern*. Some of these names have reference to the depth of the mines, such as *Jacob's Leiter*, the mine being supposed to be as deep as Jacob's ladder was high; so also the *Himmelfahrt*, or path to heaven, refers to a mine as deep as the path to heaven is high. The names which are used to distinguish the lodes are characteristic of the people. Thus one lode is called *Gottes Segen macht uns reich*; another is *Clemenzer und Neuglück's Stern*; a third *Vertrau auf Gott*; a fourth *Wiedergefundene Glück*.

Having been provided with a miner's dress, not forgetting the hinder apron, and hanging to my belt a lantern containing a lighted candle, having also a good supply of candles in my leathern pocket, I accompanied my friendly guide to the mouth of the Himmelfahrt. An extensive mine must be at all times an object of admiration to a thoughtful visitor. From the bright sunshine and smiling prospects of the surface, he suddenly plunges into a dark abyss, his solitary candle serving apparently to make the darkness more terrible. Descending by perpendicular ladders slippery with mud, and the rocky walls through which he passes streaming with condensed moisture, the air gradually becoming hotter and moister, his ears assailed by the roar of many waters and the clanking of machinery, and every now and then the discharge of gunpowder increasing the discord, he at length arrives upon one of the *levels* or horizontal galleries, and gropes his way along the dark tunnel, until the gradually increasing light and noise and bustle, disclose the scene of actual mining operations. The vein of ore sparkles from the rocky wall, and is a beautiful object; the miners are tracing it in a slanting direction, and are forming what in Cornwall would be called a *winze*, down to a lower level, which can be reached by proceeding over heaps of fragments of rock. The ascent by the perpendicular ladders is by far the most difficult and laborious part of the undertaking, and no one who has attempted it can repress a feeling of gratitude to the inventor of the machinery for raising the miners to the surface.

Having "come up to grass," as the miners term it, I had an opportunity of witnessing the cupellation of silver on a most magnificent scale. After this, I examined the works above ground, and the machinery for stamping and dressing the ores, &c.

The treatment to which the *ores of cobalt* are subjected, is different from that bestowed on the argentiferous galena, the ores of copper, &c. In the latter, the object is the reduction of the *metal*, in the former, the *oxide* alone is required. To obtain this, however, in a state of tolerable purity, requires much careful and laborious manipulation, varying somewhat according to the nature of the ore. The ores of cobalt usually contain cobalt, arsenic, sulphur, iron, bismuth, and nickel. The ores are first picked, in order to separate stony fragments, and to separate the ores into different qualities. Those ores which are very rich in cobalt are set aside for roasting, with little or no previous preparation; the ores which contain much nickel also require a special treatment. The larger bulk of the picked ore is taken to a stamp mill, in which a cam or tappet wheel lifts up a number of pestles of pine wood, shod with lumps of cast iron, and suddenly releasing them, they fall by their own weight upon the ore, which is distributed in chests beneath. The stamp troughs are furnished with a stream of water, which washes out the powdered ore, and carries it down an inclined plane. The sand and earthy matters being much lighter than the metallic oxides, are carried farthest by the action of the stream, and being collected in troughs, are separated from the heavier and valuable particles. The ore thus washed and dressed is roasted in a reverberatory furnace, furnished with a long tube, or with chambers, for receiving and condensing the arsenic. The condensing tube of the furnace commonly used in Saxony, and shown in fig. 1, is upwards of 100 feet in length. In other cases a shorter tube is connected with chambers of several stories, where the arsenic is collected. As an additional precaution, the ores are roasted only in winter, which I need scarcely remind you is much more severe, and of longer continuance on the continent, than in our own pleasant island, the cold of which is mitigated by our ocean girdle. In Saxony the fields are covered with snow for many weeks in succession, which protects vegetation from the arsenical fumes, while the low temperature facilitates the condensation of those which are retained in the condensing chambers.

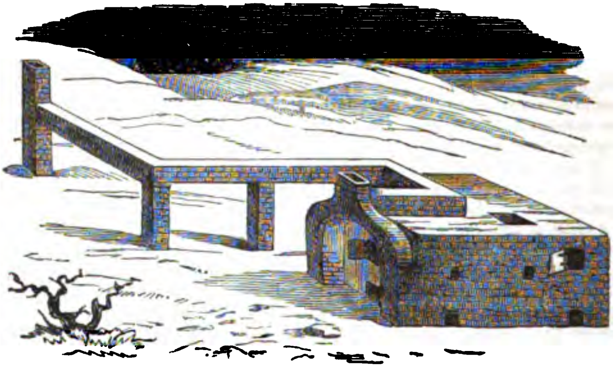

FIG. 1.—*Calcining Furnace.*

I may mention in passing, that the arsenic thus collected is an important article in commerce. The men who get it out of the chambers wear a particular dress for the occasion, fitting tightly in every part; they wear a helmet for the head furnished with goggles for the eyes, and a bandage of wet linen or a wet sponge is tied over the mouth and nostrils. The men fortify themselves for the horrid task, not as our English workmen would probably do, with gin, but with glasses of olive oil, a temperate diet, in which vegetables, eaten with plenty of butter, prevail, and entire abstinence from fermented drinks. This is the system adopted by the workmen in Silesia, at Reichenstein, and Altenburg, where large quantities of arsenious acid, realgar, and orpiment, are manufactured from arsenical pyrites.

The dressed cobalt ore is wetted and spread over the sole of the reverberatory furnace, in a layer five or six inches thick. It is cautiously heated for six hours, during which time abundant fumes are produced, consisting chiefly of vapour of water, arsenious and sulphurous acids: the heat is then increased, and is continued for sixteen, eighteen, or at most twenty-one hours, the attendant frequently moving it about with a rake, so as to bring all the parts under the action of the flame and the air. Whenever the vapour slackens or ceases to be disengaged, the man plies his rake. When all the vapour ceases, the ore becomes red hot, a sign both that the operation has been successful, and that it is now terminated. The ore is withdrawn, and the furnace allowed to cool before a fresh charge is put in, for if the ore were to be suddenly raised to this high temperature, it would become *pasty*, and could not be worked; that is, the constituents of the ore would fuse together into a kind of glass, and entangling the portions which at a more moderate heat could be driven off, thus spoil the whole operation.

The workmen's term *pasty*, is a good and expressive one. Indeed, most workmen's terms are expressive, because they are generally derived from certain obvious and striking physical or chemical properties. The loss by roasting is considerable, often amounting to as much as forty to fifty per cent. As much as from twenty-five to thirty per cent. of arsenic is deposited in the chambers from good ore. The roasted ore consists of oxide of cobalt, oxide of iron, a small quantity of the arseniate of this metal, oxide of lead, titanium, and a few other matters in small quantities.

The sand which was separated from the ore in the dressing is sometimes mingled in certain proportions with the ore in the roasting, and the product, after it has left the furnace, constitutes the *Zaffre* or *Safre* of commerce.

Now in strictness, zaffre may be regarded as a superfluity; the useful arts made no call for it, and it is, at the present day, a crude product, rather than a manufactured article. The early manufacturers added the sand to the ore in roasting, and gave an out-of-the-way name to the product, solely for purposes of concealment, just as in the days of alchemy the celebrated manufacturers of stained glass published recipes, not for the purpose of guiding, but of *misleading* others, giving the wrong metallic oxides, or the wrong proportions for the production of admired colours, and thus, while pretending to be liberal of their science, they were more miserly than the miser, for he only keeps his own; they in keeping their own, lead others astray. Indeed, I am not sure that the modern glass stainer does not owe many of his failures to his study of these old books, and the possession of what he calls his *secrets*. The secret of the so-called practical man is often a bit of science 50 or 100 years old, and the practical man himself is often one who voluntarily places himself in the position which the scientific man occupied half a century before.

You will understand then, that zaffre is cobalt ore roasted with sand. Smalt on the contrary is an article prepared with great care and in a most elaborate manner. It is in fact a true vitreous compound, a silicate of an alkali coloured blue by means of oxide of cobalt; a blue glass, in fact, reduced to powder and elaborated by the means which will be noticed presently.

The processes concerned in the manufacture of smalt may, therefore, be separated into three distinct classes. In the *first* are comprised the picking, stamping, dressing, and sifting of the ore, together with its roasting. *Secondly*, The manufacture of a blue glass of cobalt, the preparation of the materials, the mixing of them in certain proportions, and fusing them in the glass furnace. *Thirdly*, The manufacture of smalt from the blue glass of cobalt thus prepared.

Our attention has been already directed to the first class of operations. We now proceed to the second. You are aware that glass is a compound of silica and an alkali: whether the alkali dissolves the silica, or the silica dissolves the alkali, is a point not easy to determine; but it is important to bear in mind that in this wonderful and beautiful compound, the combination of the alkali and the silica is not very stable. If we reduce a piece of glass to powder, by grinding in a mortar, a considerable quantity of alkali can be washed out, and even by moistening pounded glass with water a piece of turmeric paper will detect the presence of free alkali.

The silica used by the manufacturer of smalt is obtained from quartz as pure as it can be selected. The sand (cobaltiferous quartz) obtained during the stamping of the ore is also used for the purpose. The quartz is roasted from twenty-four to thirty-six hours, when it loses its lustre and transparency, becomes of a dull white, or yellowish if it contain oxide of iron, and can be easily crushed between the fingers. It is reduced to a fine powder at the stamping engine, and is again calcined. When cold it is sifted, and, by repeated washings and decantations, the impurities, consisting chiefly of oxide of iron, lime, and oxide of manganese, are got rid of. The purified sand is dried, and again calcined to expel all traces of moisture, and it is lastly sifted and stored in boxes for use.

The potash is also purified with great care by means of lime : it is calcined and preserved from moisture.

The proportions in which the materials, namely, the silica, the potash, and the oxide of cobalt, are mixed, vary according to the commercial variety of the article required. The mixture required for the shades marked O E G and F O E G is as follows :—

2½ cwt.	of ordinary roasted ore called schlich
2 "	of zaffre
20 "	sand
3½ "	eschel—glass of cobalt slightly coloured
10 "	potash
38 cwt.	

The mixture for smalt marked M E, M C, and F C, is as follows :—

2 cwt.	of the best roasted slich
5 "	sand
2 "	eschel
4 "	potash
13 cwt.	

The ingredients are mixed in a wooden trough, two feet deep : they are first interstratified in regular layers : a layer of sand is spread evenly over the bottom of the trough : upon this is spread a layer of roasted ore, then a layer of potash, and so on until all the materials are disposed of. The workman next begins, at one end of the trough, intimately mixing the ingredients with a wooden shovel. They are then melted together in pots in a furnace, which does not materially differ from a regular glass-blower's furnace, except that in some places it is rectangular in shape. The usual form, however, is that of a domed vault, and the pots, generally six in number, are arranged equidistantly within the circle described by the wall of the furnace. (See fig. 2). Wood is the fuel used both

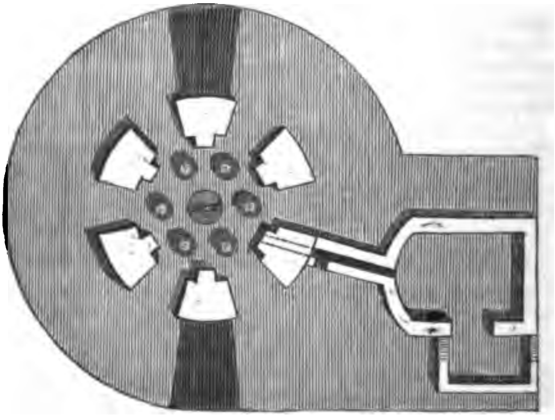

Fig. 2.—*Plan of Blue Glass Furnace.*

here and in the calcining furnace. The flame rises through the centre, and, after heating the interior, escapes along a flue into an oven, seen to the right of the figure, in which the quartz is calcined. Each pot contains about ¾ cwt. of material, and is made of well-kneaded clay, rolled out into a dough, large strips of which are adjusted to the shape of an internal mould. When the bottom and sides have been thus formed, and somewhat consolidated at the ordinary temperature, the domed top of the pot, which has been moulded separately, is kneaded on. After remaining for some time exposed to the air, the pot is annealed in a furnace, and gradually raised to a red heat, in which state it is brought out upon an iron truck and deposited in its bed within the furnace, the wall of which has been taken down for its reception, and is immediately bricked up again. Every new pot is first charged with eschel (an inferior blue glass in powder, the production of which will be noticed presently), the effect of which is to give the pot an interior vitreous lining. Now supposing the furnace to be at the proper heat, and the pots all empty, the mixture above described is charged into them by means of iron ladles, furnished with long handles. In the course of about eight hours the mixture fuses, and a vitreous crust forms upon the surface. This is broken through, and the materials are stirred up by means of an iron tool, made red-hot for the purpose. When the pots appear at a white heat their contents are quite fluid, and the chemical combination of the materials has been effected. This is termed the *schmelzung*, or the melting, liquefaction, or fusion of the materials; and this brings us to the meaning of the word *smalts*. The German verb, *schmelzen*, signifies to melt, dissolve, liquify, or *smelt*. The substantive, *schmelz*, means *enamel*, which in fact is a borax glass, produced by melting silica, borax, oxide of tin, and other materials. So also *schmelz*, or *schmalzblau*, is a substance obtained by melting potash, silica, and oxide of cobalt. The word *smalt*, therefore, in its literal sense, is nothing more than a product obtained by *melting*.

When the glass attaches itself to the workman's rod, and can be drawn out into threads, it is ready for pouring. There are, however, two impurities which must be carefully avoided, because they interfere with the beautiful homogeneous blue colour which the glass ought now to present. The first impurity is *glass-gall* or *sandiver*, which is known to the manufacturers of flint-glass as a white porous scum which collects on the surface of the glass in the glass-pot. This scum consists of impurities in the alkali; they are salts which more or less exist in alkalies, and having little or no affinity for silica, and being specifically lighter than glass, they rise to the top, and form *glass-gall*, which is skimmed off. Of course, the purer the alkali the smaller the quantity of this substance, but with every precaution, short of the purity obtained in the laboratory, where only small quantities are used, some of it must always be produced when the quantity of alkali is weighed out by hundred weights. In the manufacture of smalt, where great attention is paid to the purity of the sand and the alkali, the glass-gall forms a layer of very liquid glass of a pale blue colour; it consists of sulphate of potash, chloride of potassium, and a little alkaline silicate. This layer being removed, the blue cobalt glass is ready for ladling.

As the glass-gall, on account of its levity, rises to the surface, so the other impurity, on account of its weight, sinks to the bottom. This impurity consists of the different metallic impurities of the oxide of cobalt, and these are especially abundant when the cobalt ore contains much nickel; because as this substance does not oxidize readily, and, moreover, if mingled with the oxide of cobalt would cause it to give the glass a green, instead of a blue colour, the nickeliferous ores of cobalt cannot be purified by such complete roasting as is practised with those ores which contain but little nickel. The nickel, however, separates in the glass pot, and combining with the arsenic and other metallic impurities sinks to the bottom, and being separated from the blue glass forms an article which is known in commerce by the name of *speiss.* It is variable in its composition, for it may contain cobalt, nickel, iron, arsenic, bismuth, and even silver. The speiss forms masses or globules more or less considerable, and unfortunately it does not entirely subside, for diffused globules of it begin to be met with before the glass pot has been half emptied. This may be accounted for in two ways : first, it is well known that common flint glass in the glass-pot of the furnace is of very unequal density, it goes on increasing in density from the surface to the bottom, so that if a pot-full of glass be allowed to cool, and then be divided into horizontal sections, the top section would be the lightest, the bottom the heaviest. Now it will readily be understood that the metallic impurities of the roasted ore of cobalt may be very nearly, if not quite, of the same specific gravity as the blue glass which occupies the lower half of the glass pot; so that, instead of sinking to the bottom, globules of them may remain suspended in the heavy glass, as a balloon is suspended in air, or a fish in water. In some works the glass pots are provided with a hole in the bottom, which during the melting is stopped up with clay, and when the melting is complete the speiss is allowed to run off by this opening.

The blue glass is taken out of the glass pots in iron ladles, and as the object of the subsequent operations is to reduce it to powder, that object is facilitated by emptying the ladles into vessels of water in which the water is constantly renewed. The glass being at a red heat when it comes in contact with the water, becomes like Prince Rupert's drops, excessively brittle, granular, and easy to pulverize. When the glass pot is about half emptied, the workman examines the contents of his ladle to see if it contain speiss ; and if such be the case he carefully separates it from the blue glass by skilful pouring. All the glass pots are in this way emptied before a fresh charge is given to any one of them; for so great is the reduction of temperature in charging three or four of the pots, that the contents of the others would become solidified, or at least too pasty to be ladled. The charging of the six pots reduces the furnace to a brownish red heat, and an hour and a half is required to get it up again to the proper temperature, which is that of an ordinary glass furnace.

The third series of operations into which we have divided the manufacture of smalt now commences. These consist of the apparently simple process of reducing the blue glass to powder. Now I need scarcely remind you, that if I were to reduce to powder this sheet of blue transparent glass by pounding it dry in a mortar or by other means, this colour so beautiful and so full by transmitted light, would in its disintegrated state be a light dingy powder, and most of the colour of the sheet of glass would appear to have vanished ; and yet who can doubt that the same amount of colour would be present in the powder as in the sheet ? This remark will enable us to understand somewhat of the difficulty of converting the blue cobalt glass into a powder of an intensely blue colour, and not only that, but of various *shades* and intensities of blue, such as are presented by the beautiful specimens and patterns on the table and around the room.

The blue glass is first crushed in the dry state at a stamping mill ; it is then sifted to the size of ordinary sand ; and this sand is afterwards ground in a mill between horizontal granite stones, from 1½ to 2 cwt. at a time, wetted with a little water, and the grinding is continued for from four to six hours. The construction of this mill will be

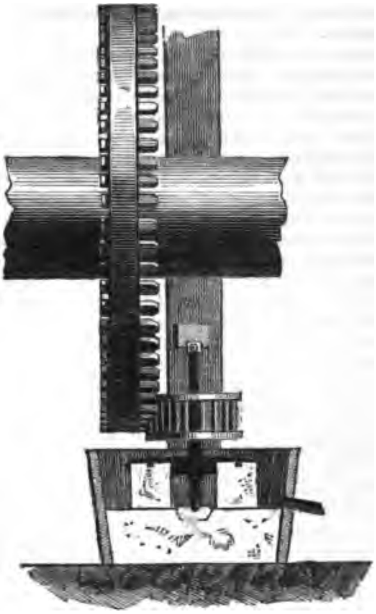

FIG. 3.—*Mill for Grinding Smalt.*

understood by glancing at fig. 3. The powder thus produced is transferred to large vats full of water, and in the course of a very few minutes a separation of particles takes place in the powder; the heaviest particles, or those which are richest in cobalt, form a deposit in the vats, and this deposit constitutes one of the commercial varieties of smalt, under the name of *azure*, *coarse blue*, or *streublau*. The number of minutes required to form this deposit varies with the season of the year. In winter, when the water in the vats is colder and consequently denser, the particles of coarse blue are longer in subsiding than in summer, when the higher temperature and diminished density of the water allow the particles to subside more quickly. The whole difference, however, is merely a question of a minute or two, for the whole time allowed for the deposit is only a few minutes. The water which holds the finer particles of the powdered blue glass in suspension, is drawn off into other vats, where it is allowed to subside for a time varying from three-quarters of an hour to one hour and a half, according to the quality of powder required. The deposit formed in this second series of vats is called *Farbe*, the German word for colour.

The water drawn off from this second series of vats is poured into reservoirs, where it is allowed to remain for an indefinite length of time; and the deposit, which consists of a mixture of several varieties of smalt, is known by the name of *Eschel*, or *blue sand*. This is the origin of the substance which forms one of the ingredients of the mixture prepared for the glass-pots.

You will thus understand the manner in which three varieties of smalt are produced: the blue cobalt glass being reduced to powder, is thrown into water, and the deposit which forms in the course of a few minutes, being collected, constitutes *azure*. The water which has thus discharged the heavier particles being allowed to remain from forty to ninety minutes deposits those varieties of smalt known by the name *Farbe* or *Colour*. The water still contains the *Eschel* or blue sand, which is deposited by long repose.

But the colours thus obtained are all again subjected to the action of water before they are fit for the market. Each deposit is agitated in tubs abundantly supplied with water, and is then left to subside for a length of time, which experience has taught will produce the particular variety required. During the subsidence any floating impurities are separated by means of a fine horse-hair sieve. The water is then carefully decanted off into another vessel; the deposit just formed is treated with fresh water, if necessary; and all these waters in their turn, on being drawn off, deposit different varieties of smalt, either in the form of Farbe or Eschel.

Now the chemistry of these curious processes is not very clear. We have traced the blue glass through a series of stampings and laborious grindings, the object of which was to reduce it to powder. This powder, doubtless, consists of heterogeneous particles; some particles containing more cobalt than others; others more silica; others more potash. By diffusing this powder through water the heaviest particles, which happen to be those which contain most colour, or oxide of cobalt, subside first, and are isolated by immediately drawing off the water. The deposit which next forms from the water thus drawn off is, in its turn, washed many times by decanting from one vessel to another, and the result of these repeated washings is a powder deeply coloured, and a powder containing very little colour.

That excellent Chemist Dumas has suggested, that these repeated washings, by removing a portion of the alkali from the blue glass, tend to bring it to the condition of a super-silicate. This action takes place most favourably on the finer particles, and less so on the coarser powder. At any rate it seems not improbable that the uncombined or loosely combined potash is thus got rid of by these repeated washings. And experience has shown that they are necessary to the production of a permanent colour, one that will successfully resist heat and moisture. Hence we see the reason, if this explanation be the true one, why alumina, lime, and bases, which tend to make glass resist the action of water, should be carefully excluded from the glass pot, while on the other hand arsenious and phosphorous acids in small quantity are of advantage, for they tend, on the contrary, to assist the extrication of the potash, since that alkali forms with these acids salts which are more soluble than silicate of potash.

The glass of cobalt therefore appears to be a mixture of different compounds, which admit of being grouped under two principal varieties: *first*, the less fusible silicates, in which *cobalt* prevails, and which resist most perfectly the action of water; *secondly*, the more fusible silicates, in which *potash* prevails, and which are more susceptible of the action of water. The former silicates constitute the *coarse blue*, *azure*, or *streublau;* the latter are partially decomposed by water, which subtracts a subsilicate of potash, leaving a supersilicate of potash in a minutely divided state. This doubtless explains why it is that the smalt deepens in colour, while a powder, which contains but little colour, is separated by washing.

The *coarse blue* powder of the first deposit is almost identical in composition with the glass of cobalt.

The *Farbe*, or *colour*, owes its tint to the subtraction of potash.

The *Eschel* contains more silica and less potash and cobalt than the other varieties. The eschel also contains gelatinous silica, and the washing waters, which are finally thrown away, contain a subsilicate of potash.

The beauty of smalt, however, and the celebrity which certain manufacturers have obtained for their article, seem to depend, to a great extent, upon the presence of certain matters which we should be disposed to regard as accidental: the presence of four or five per cent. of arsenic and arsenious acids; from six to nine per cent. of phosphoric acid; very minute portions of zinc, tin, antimony, and nitre, are said to heighten the beauty of smalt. On the other hand, the colour of smalt is weakened or injured by the presence of nickel, lead, iron beyond ten per cent., bismuth, borax, soda, the alkaline earths, alumina, feldspar, fluor spar, and sulphur. The manufacturer endeavours to attain success by using pure materials, and so far he is right, insomuch as he uses tolerably pure silica and potash; but we cannot help thinking that a little more chemistry bestowed upon the preparation of the ore would improve the product and lessen the cost of manufacture. The smalt maker had obtained a high degree of success in the practice of his art before the Chemist could tell him what was the real nature of cobalt; and, like many of the useful arts which preceded the birth of science, success was attained by patient and ingenious men, by a sort of intellectual instinct, each man working for himself, retaining with jealous care his own secret, when, by long labour or happy chance, he had secured it. The suggestion of publishing it to the world would have appeared to him like intellectual suicide; the proposal to bring it before the Society of Arts, if such a society could have existed at those periods, would have been received with scorn. In some cases the man's secret died with him; in others it was bequeathed to a son and heir, who did not know how to value it; under a third supposition, the secret was betrayed by a dishonest workman, or it might have been re-discovered by a rival manufacturer. At any rate some, if not all, of these secrets came to be concentrated in one individual or set of individuals; they became the joint stock property of the trade; the apprentice in the course of his initiation became gradually admitted into the art and mystery, and when his time had expired and he became his own master, the instinct of self-interest would close his mouth to the listening ears of the man of science, and rigorously conceal his processes from his prying eye. But, if forced to speak, he seeks to mystify his art and mystery, and on no account will he throw open the doors of his factory. "What!" said a manufacturer to me the other day, "Describe my chocolate mill! would you ruin me?" But when manufacturers themselves become scientific men, or are imbued with the wide, the liberal, and the charitable spirit of true science, how different is the result. When men like Parkes and Henry, and Dalton and Allen, become manufacturing Chemists, the useful arts become benefited and ennobled: there is a sort of reflex action, a mutual interchange of good offices, between the sciences and useful arts, and the one cannot advance without greatly contributing to the advance of the other. To make a process known to the world is to throw the light of intelligence upon it, and to improve it. All our treatises on the useful arts, if written by competent hands, must be productive of good: all the papers which are read to this Society, and the discussions to which they lead, must liberate a certain amount of thought, intelligence, and inquiry; and when did thought, and intelligence, and inquiry, properly directed, fail to do good?

If I am not trespassing too much upon the patience of the meeting, I should like, before I proceed to notice the uses to which smalt is applied, to go over the processes concerned in the manufacture of that variety of smalt which is known in commerce by the letters OC. The blue glass having been crushed, stamped, sifted, and ground, is diffused through water. Forty-five minutes are allowed for the formation of the deposit; the water, still holding coloured particles in suspension, is then drawn off into another vat, where it is allowed to remain thirty-six hours. This water is then drawn off into a reservoir, in which, after a considerable time, it deposits the nearly colourless eschel.

The smalt deposited in the second vat adheres strongly to the bottom; it is taken out in lumps, which are crushed on a board with wooden mallets and between cylinders, and the powder is washed many times in different waters. About three cwt. of smalt are washed at once in one tub. This quantity is well stirred up in pure water by means of wooden tools until the azure is completely suspended. The floating impurities, consisting chiefly of a little glass gall, are removed by a hair-strainer. The mixture is then left for twenty-two or twenty-four hours, at the end of which time the water is a little coloured with eschel; this is drawn off into the reservoir, and the deposit is taken out and broken up as before. It is again stirred up with fresh water, and left for from eighteen to twenty hours, and then decanted. This operation is once more performed, but the time allowed for the formation of the deposit is sixteen or seventeen hours. The water being drawn off, the washing is completed. All the shades of azure are prepared in this way, the different tints of blue being given by allowing a longer or a shorter period for the deposit to be made.

These various precipitates being taken out of the vats and drained, are placed upon shelves in a room which is heated by a stove, or some manufacturers prefer to dry them by spontaneous evaporation, in rooms open on all sides to the air.

The precipitates dry into hard masses, which are crushed by mallets, passed between cylinders, and sifted in fine sieves: the sieves are enclosed within a wooden case, and are set in motion by machinery. The azure is then dried in a hot room, under the tiled floor of which passes a winding flue. A number of shallow wooden troughs are arranged in this hot room, in which the smalt is placed, in layers two or three inches thick. It is stirred up from time to time with a rake, and when sufficiently dry, it is taken into a room in which are arranged a number of squares containing the different shades of smalt with their numbers. In the midst of this room is also a box closed on all sides, within which is an axis, with a horse-hair sieve attached, and placed below a hopper. The smalt being put into the hopper, the workman sets the axis in motion, and with this final sifting the manufacture is complete. It is packed in small casks containing half a cwt. each: it is first moistened with a little water to prevent waste, and the cask is marked with the name of the shade.

It is calculated, that for every 100 parts of glass of cobalt employed, 95 parts of material are obtained; this includes the refuse of the washings, which is again employed in the glass pot. The saleable product, however, from 100 cwt. of blue glass is about 60 or 70 cwt. of azure or coarse blue.

Such is the manufacture of smalt, which for upwards of 300 years has been carried on with profit both to the producer and the consumer; and now, after this long period of success, it is a curious fact that the miner of Saxony is once more threatened with a superfluity of comparatively useless ore. He does not complain now that the rich ores are deteriorated through the malign influence of such evil spirits as cobalts; his evil spirits come upon him now-a-days (in the case of smalt at least) in the shape of commercial tariffs, and the operation of our own revised tariff is very remarkable. Until within a very few years Saxony produced annually about 8000 cwt. of zaffre or smalt; Bohemia 4000 cwt.; Prussia 600 cwt.; and Norway 4000 cwt. In the year 1840, the imports of smalt into Great Britain amounted to 118,638 lbs., of which, 97,751 lbs. were from Norway, and the remainder from Germany and Holland. In 1842, the imports amounted to 145,470 lbs. With respect to zaffre, this country imported, almost entirely from Germany, 4660 cwt. According to the new customs' duties, cobalt and zaffre can be imported free of duty, but a duty of 10*s.* per cwt. is levied upon smalts. This 10*s.* duty has proved fatal to the manufacture, for by our new tariff, a rival colour is admitted free of all duty: this colour is *ultramarine.* It is customary to associate with ultramarine a very high price, and the genuine ultramarine is high-priced. Mr. Newman, of Soho Square, who has kindly supplied the various specimens of smalt and ultramarine which are before you, has also lent me a specimen of genuine and very choice ultramarine, the price of which is twenty guineas per *ounce;* one variety is commonly sold in his shop at seven guineas per *ounce.* These are obtained from the colouring matter of the *lapis lazuli,* or *lazulite,* a Siberian mineral, consisting of

Silica	34,	or according to another analysis	44
Alumina.........	33	" " "	35
Sulphur	3		
Soda	22	" " "	21

Previous to the year 1828, all attempts to procure ultramarine artificially had failed; but in that year, M. Guimet succeeded, by a process which he kept secret, in producing an artificial ultramarine, which was sold at about 42*s*. per pound. Some time after, the process was discovered and published by Gmelin; a third method was discovered by Persoz; a fourth by Robiquet, and now the substance has become an important article of manufacture; it is made in considerable quantities at Cologne, and the small towns on the banks of the Rhine, and being a more beautiful colour, more intense, and more brilliant than smalt, and being moreover admitted free of duty, it bids fair to supersede that colour, especially as it can be sold at so low a price as 15*d*. per pound.

Ultramarine appears to be a compound of silicate of alumina and silicate of soda with sulphuret of sodium, and the colour is supposed to be due to the reaction of the last constituent upon the former two. Ultramarine may readily be distinguished from smalt by the action of nitric acid. The former decomposes the acid, which passes off in red fumes, and the colour is completely destroyed; smalt, on the contrary, is not in any way acted on by the acid. I must, however, refrain from entering into details which are foreign to the subject of this evening's paper, and if I have not wearied you with too minute a description of the processes concerned in the manufacture of smalt, you will probably on some future occasion not object to hear something about the manufacture of the varieties of ultramarine, from that which costs 20 guineas an ounce, to that which the wholesale dealer purchases for 15*d*. a pound.

The uses to which smalt is or has been applied in the manufactures of this country are various. Perhaps the greatest demand for it is for printing the blue patterns upon pottery ware; and this demand we should suppose would continue, for smalt is an enamel colour, which artificial ultramarine is not. The method of printing pottery ware is as follows: — The landscape or pattern is engraved upon copper, and the smalt or other colour, which is mixed with boiled linseed oil, is laid on the plate in the same manner as ink is usually applied by copper-plate printers. The plate is then gently warmed on a stove, and a sheet of damped tissue-paper being laid on it, it is passed through the press. The paper, wet with the colour, is delivered to a girl, who cuts away the blank portion which surrounds the pattern and passes it to another girl, who applies the inked side of the paper to the pottery-ware, which is now in that porous condition known by the technical name of biscuit. A third girl rubs the paper closely against the piece of biscuit ware, by means of a tightly rolled cylinder of woollen cloth, and thus the colour is pressed into the absorbent surface. The piece is then put aside for an hour, when it is transferred to a cistern of water, which softens the paper and allows it to peel off, after having left the pattern impressed upon the biscuit. The pattern is protected by the subsequent operation of glazing.

Colours are usually applied to the surface of glass and porcelain by means of a camel's-hair pencil, the vehicle for the colour being oil of lavender or oil of turpentine. The celebrated blues of Sèvres porcelain are produced from cobalt dissolved in acids and precipitated. The processes concerned in their preparation are given by Brongniart in his *Traité des Arts Ceramiques*.

Coloured glass, properly so called, in which the colour, instead of being superficial, pervades the whole of its interior, is a pot metal, and is produced by any of the methods commonly adopted for making sheet glass. The specimens of cobalt glass which are on the table can of course be best judged of by transmitted light. We may also examine these colours in an instructive manner with reference to their accidental or complementary colours—a subject which has recently occupied the attention of the society. If I place before the lamp which illuminates this white screen a plate of blue glass, and then cast a shadow upon the screen by means of an object placed between it and the lamp, we get a dark shadow upon a blue ground: if I now bring another light, so as to double the shadow, we then get the two shadows blue and orange, complementary to each other.

For a most important application of smalt as a decorator, I must refer to the specimens of paper hangings which surround the room. You will see in them several varieties of blue, some of them produced simply by toning down by means of white. To describe how these specimens are produced would be to describe the manufacture of paper-hangings, which I must leave in the able hands of our member, Mr. Simpson, who has kindly furnished these specimens.

The writing-paper maker also uses smalt in order to cover the yellow tint which is common in paper made with bleached rags, the chlorine not destroying some of the mineral colours with which the rags are dyed. Berzelius remarks that the silica contained in writing-paper blued by means of smalt blunts the nibs of pens. Smalt was formerly used in the manufacture of bank-note paper, and the ash produced by the periodical combustion of notes at the Bank forms a blue vitreous slag, which may often be met with in collections of minerals. Blue tinted writing-paper leaves a blue ash when burnt, and often exhales the peculiar odour of arsenious acid from the presence of arsenic in the smalt. There is some difficulty in keeping the smalt uniformly suspended in the pulp, and hence the lower side of the sheet is generally bluer than the upper.

Smalt is also used by the calenderer for imparting a fine blue colour to the starch with which he dresses his muslins and other goods; the object of this, as in the case of paper, is to cover the disagreeable yellow colour to which some descriptions of woven goods are subject.

In conclusion, I have to thank several of the members for supplying me with the specimens before you on the table of encaustic tiles, blue and ornamented glass and porcelain, paper, bank-note slag, and other articles in which smalt is concerned; and I have also to thank you for your polite attention to this long lecture.

CEDRONE SEED.

The first European discoverer of the virtues of the cedrone seed, is Dr. Luigi Rotellini, at present a medical practitioner in the city of Santo Domingo, who formerly sojourned in New Granada. In an article entitled "*Osservazioni terapeutiche sopra alcuni Prodotti Vegetali della Nuova Granada,*" &c., printed as early as 1846, in the "*Annali Medico-Chirurgici del Dottor Telemaco Metaxa*" (*Anno* vii. vol. xii. p. 281), he says of the cedrone seed:—"I call the attention of the illustrious Medical College to the seeds of this fruit in consequence of its active property upon the animal economy. I am still unacquainted with the tree that produces it; as it grows at a distance of more than two hundred miles from the coast, in the midst of a desert only inhabited by the Motilones, an Indian tribe of wandering and ferocious habits, so that I could only procure a fruit with its seed, and a small piece of a branch, but with a little patience I hope to procure more. From an inspection of the seed, and from the information which I received from an Indian, I believe that the plant belongs to the genus Strychnos, of the natural family of Apocyneæ of Jussieu. The bitterness of these seeds is insupportable, and the Indians use them as a specific against the bite of any venomous animal without exception. They employ them with very good effect, and in preference to the Guaco (*Mikania* Guaco) and the Contrayerva, against the bites of venomous insects and serpents, which are so abundant in that country. The seed is likewise used as a tonic, febrifuge, and anti-tetanic, in doses from one grain to eight or ten grains of the substance finely powdered. A dose of twenty-five to thirty grains has caused poisoning and death; and hence I judge from the deleterious effect of its active principle that this is, as I have already observed, Strychnia." R. H. S.—*Athenæum*.

Santa Domingo.

[The cedron plant is the *Simaba Cedron*, a Simarubaceous plant.—*See* Pharmaceutical Journal, vol. x., No. vii., p. 344.]

ON ACONITINA.

BY DR. A. VON PLANTA.

Aconitina, prepared by Merck, of Darmstadt, is a yellowish-white amorphous powder. It is not quite pure, and yields by combustion a not inconsiderable portion of inorganic matter. For analysis, therefore, it requires purification. This was effected as follows:—

The aconitina was dissolved in ether, by which a brownish resinous-looking substance remained undissolved. By evaporation, by means of the air-pump, the aconitina was obtained in the solid state. The alkaloid thus purified was dissolved in absolute alcohol, and the solution poured into water with strong agitation. The aconitina was thrown down in the form of a flocculent precipitate, which was dried by means of the air-pump, and was then found to be pure white. Aconitina thus purified possesses, according to Planta, the following properties:—

It is a perfectly colourless inodorous powder, which is permanent in the air. It has a greater specific weight than water, in which it is almost insoluble. Alcohol dissolves it more readily; ether less so. At 80° C. it melts into a transparent vitreous substance without losing in weight. If heated beyond 120° C. it becomes brownish, and is decomposed without evaporating. It has a strong alkaline reaction, and forms with acids neutral compounds, which appear to possess no tendency to crystallize. Ammonia and potash throw it down from its solutions in flocculi, which are but slightly soluble in an excess of the precipitant. Carbonate of ammonia, bicarbonate of soda, and phosphate of soda, occasion no precipitate. Chloride of gold causes a solid yellowish-white precipitate, scarcely soluble in muriatic acid. Chloride of platinum has no effect. Chloride of mercury, and also sulphocyanide of potassium, produce white caseous precipitates; that produced by the first reagent dissolves tolerably readily in muriatic acid and in sal ammoniac. Tincture of iodine causes a kermes-brown precipitate. Tannic acid or tincture of galls produces, upon the addition of one drop of muriatic acid, solid flocculi, which are only dissolved in a large quantity of muriatic acid. Nitro-picric acid causes a solid precipitate of a sulphur-yellow colour, and which is insoluble in ammonia.

Repeated analyses both of the pure aconitina and of its compounds, with chloride of gold, showed its composition to be as follows:—

	Per Centage.	Eq.
Carbon	67.54	60
Hydrogen	8.81	47
Nitrogen	2.62	1
Oxygen	21.01	14
	100.00	

Buchner's *Repertorium*, Bd. vi., Heft 3, p. 381.

ON EXTRACT OF LIQUORICE.

DR. MOHR has lately published (*Archiv d. Pharm.* lxiii. 262), the following results of his experiments with liquorice-juice. The starchy sediment of the commercial juice, after being deprived of the extractive substances by cold water, shows, under the microscope, no starch grains; neither does the cold prepared filtered extract, when tested with iodide of potassium and chlorine water, betray the presence of dissolved starch. If, however, the sediment be boiled with water, the filtered liquid was readily coloured deep blue by iodine. The same was the case when the sediment was extracted by boiling diluted sulphuric acid.

If liquorice-root be cut and exhausted by cold water, no trace of starch is discovered in the filtered liquor; but when prepared with hot water, iodine colours it blue, a sufficient proof that the root contains starch, part of which passes into the extract whilst the root is boiling. The author found, moreover, that a small piece of liquorice from Martucci, in Calabria, yielded, on being treated with cold water, a filtered liquid, which became blue by iodine, whilst another sort of liquorice did not show this re-action.

It appears, therefore, that during the inspissation of the first solution the starch assumes under certain circumstances a form which is insoluble in cold water. On the other hand, sixteen ounces of root having been cut and three times boiled with water, and the starch decoction evaporated to dryness, three ounces 6½ drachms of dry extract were obtained, which did not completely dissolve in water. The solution of this extract, filtered from the sediment, assumed with iodide of potassium and chlorine water a strong blue colour, which shows that all the starch had not become insoluble by the inspissation of the extract. The sediment of this extract, although very much resembling that of the commercial liquorice, amounted only to eight per cent.; and since, according to the experiments of Overbeck and others, the different sorts of liquorice contain twenty to forty per cent. of foreign substances, which remain behind as sediment, it cannot be doubted, but that the manufacturers add some powder to the liquorice in order to keep it dry. Besides the proportion of soluble extract, the colour and taste may also serve as tests for the quality of commercial liquorice. The solution of some inferior qualities is dark-coloured and sooty, and the sediment blackish brown; whilst that of the better qualities is light-brown, and can easily be extracted.

The best sorts of liquorice-juice from Calabria are obtained from Martucci, Baron Ferrara, and Casano, provided with their stamp; these sorts contain 62 to 67 per cent. of soluble extract, and 17, 21, to 26 per cent. insoluble dry residue.—*Buchner's Repert.*, 1851, No. 19, p. 102.

CAPE GUM.

Acacia horrida, Willd. A large tree. *Stem* and *branches* glabrous, but armed with large white spinous stipules. *Leaves* bipinnate; *pinnæ* 2-3 yoked; *pinnules* many-yoked, oblong, blunt. *Leafstalks* glandulous at base and on the apex. *Flowers* stalked, axillary, globose, polygamous, yellow, scented.

The demulcent derived from the *Doornboom* is well known as an article of commerce. It exudes spontaneously from the bark of the trunk and branches, and hardens in the sun without losing its transparency. Although the *Cape Gum* is inferior in appearance and in intrinsic value to that of Northern Africa, it may yet be improved by care and attention. The *Acacia Giraffæ, Willd.* (*Kameeldoorn*), growing beyond the limits of the Cape colony, is said to yield a superior gum.—*Floræ Capensis Medicæ Prodromus, by L. Pappe, M.D.*

CAPE ALOES.

Aloe ferox, Lam. *Stem* very lofty. *Leaves* perfoliate, thick, juicy, sword-shaped, deflexed, glaucous, prickly throughout, but bearing larger and sharper spines along the margins. *Flowers* racemose, crowded. *Stamens* double as long as the corolla.

The Cape Aloes are procured from several species of this extensive genus, peculiar to South Africa. The *Aloe ferox, Lam.*, a native of Swellendam, is generally acknowledged to yield the best extract. That obtained from the *Aloe Africana, Mill.*, is almost equally good, but not so bitter, nor so powerful as a drastic. It is the produce of the eastern districts, whence large quantities are annually exported. The aloe, commonly used by the colonists, is prepared from the *Aloe plicatilis, Mill.*, whose extract is a much milder purgative, and much resembles the Barbadoes Aloes. It inhabits the mountainous range near the Paarl, Drakenstein, and Fransche Hock. It is much to be regretted, that the farmers do not take more trouble in purifying this valuable drug.—*Floræ Capensis Medicæ Prodromus, by L. Pappe, M.D.*

POISONING BY TWENTY-NINE GRAINS OF VERATRIA: RECOVERY.

The following authentic case has been communicated to us, with a request that the name of the patient (a retired Chemist and Druggist) may be suppressed:—

A gentleman had a draught and liniment made up at the same time; the draught was to relieve colic, and consisted of chloric ether, &c. The liniment was composed of veratria gr. xxx., and rectified spirit ℥ij., and was intended to be rubbed on the forehead to relieve a nervous chronic pain in the head. The dispenser finding his stock of veratria insufficient, put only xxix. grs. of veratria in, and reduced the amount of spirit in proportion.

On his way home, feeling pain, the patient went into a tavern and got a glass of hot ale and ginger, and then called for a second, into which he put the *liniment*, supposing it to be the draught. Almost immediately afterwards he experienced a peculiar sensation of oppression and anxiety in the head, a sense of suffocation, and he then discovered his mistake. Medical aid was at hand; vomiting was produced by an emetic of sulphates of zinc and copper, tickling the throat, &c. In about half an hour after vomiting, very violent sneezing came on, and continued for about an hour: the patient then slept, and had no disagreeable sensation or symptom since.

THE RATE OF IMPORT DUTIES ON DRUGS.

The following statement shows the fluctuations in the rate of Customs' duty charged on the importation of various drugs, &c., from 1826 to the present time. The articles comprised in this list are those of which the quantities imported, retained for home consumption, and exported, were either given in the previous number of the Journal or are contained in the present. In a subsequent number we shall notice other drugs in the same way.

Almonds.—The duty in 1826 was 15*s.* 10*d.* on bitter, the produce of British possessions (per cwt.) and on other sorts, 47*s.* 6*d.*; on foreign bitter, 31*s.* 8*d.*; Jordan, 95*s.*, and other sorts, 47*s.* 6*d.* In 1833 the duty was reduced on British possessions to 4*s.*; other sorts, 40*s.*; on foreign bitter, 4*s.*; Jordan, 40*s.*; other sorts, 20*s.* In 1842 the duty was reduced to 2*s.* on bitter; Jordan, 25*s.*; other sorts, 10*s.* per cwt. In 1845, the duty on bitter almonds was repealed, the duty on sweet remaining as last mentioned. We import almonds from Barbary, Spain, &c.; and export them to America, &c.

Arrow Root.—The duty on this article of 1*d.* per lb. from British possessions, and of 2*d.* per lb. on foreign produce, was reduced, in August, 1832, to 1*s.* per cwt. on British possessions, whilst the duty of 2*d.* per lb. on the foreign was retained. In 1842, the duty on foreign arrow root was reduced to 5*s.* per cwt. In 1846, the duty was fixed at 6*d.* per cwt. on British possessions, and 2*s.* 6*d.* per cwt. for foreign. Our principal supply of arrow root is derived from the West India islands. We export it to our Australian Colonies, &c.

Ashes, Pearl, &c.—The produce of British possessions duty free since 1826; the duty on foreign ashes being at that time 6*s.* per cwt. In 1842, the duty was reduced to 6*d.* per cwt., and in 1845, totally repealed. Our North American colonies supply us with four-fifths of the pearl ashes we import, the United States and Russia sending the chief part of the remainder. Our principal export is to Belgium.

Bark, Peruvian.—The duty, which previously to 1842 was 1*d.* per lb., was then reduced to 1*s.* per cwt., and repealed in 1845. Peru and Chili supply us with bark, which we export chiefly to Holland, Belgium, and the Italian States.

Boracic Acid.—The duty on this acid reduced from 50 per cent. *ad valorem*, to 4*d.* per lb. in 1823, remained at the same rate until 1833, when it was fixed at 4*s.* per cwt. In 1842 a further reduction to 6*d.* took place, and in 1845 the duty was repealed. The Lagoons of Tuscany supply us, *viâ* Leghorn, with boracic acid, which is chiefly employed in the preparation of borax.

Borax.—The duty on this article was reduced in 1823 from 1*s.* 8*d.* per lb., on refined, to 6*d.*; and on unrefined from 8*d.* to 3*d.*, at which time the drawback on the exportation of borax refined in Great Britain was repealed. In 1833, the duty was reduced to 10*s.* per cwt. on refined, and 4*s.* per cwt. on unrefined. In 1842, a further reduction took place, the duty being then fixed at 5*s.* per cwt. on refined; 6*d.* per ton on British unrefined, and 1*s.* per ton on foreign unrefined. We import borax from Tuscany, and export chiefly to America.

Caraway Seeds.—A duty of 30*s.* per cwt. was charged from 1826 to 1842, when a reduction to 5*s.* per cwt. took place on the produce of British possessions, and 10*s.* on foreign seeds; a further reduction to 2*s.* 6*d.* on British possessions, and 5*s.* on foreign took place in 1846, which duty is still maintained. The principal import of caraway seeds is from Holland, and the export to the colonies, &c.

Cassia.—The duty on cassia, reduced in 1824 from 2*s.* 6*d.* per lb. on the produce of all countries, to 1*s.* per lb., was, in 1829, fixed at 6*d.* per lb. on British possessions, and 1*s.* per lb. on foreign. In 1842, a reduction of the duty to 1*d.* on British possessions, and 3*d.* on foreign, took place, which still remains. The countries from which we chiefly obtain our supply of cassia are China and the British territories in India. The Hanseatic towns, Prussia, Russia, Holland, Turkey, and Austria, are the chief places to which we export it.

Castor Oil.—The duty in 1826 was 9*d.* per lb. from any British possession within the limits of the East India Company's Charter; 6*d.* per lb. on the produce of any other British possessions, and 1*s.* per lb. on the oil imported from foreign countries. In 1828, the duty was fixed at 3*d.* per lb. from any British possessions whatever, the duty on foreign remaining the same. In 1833, the duty on British possessions was reduced to 2*s.* 6*d.* per cwt. In 1836, a duty of 1*s.* 3*d.* per cwt. was fixed on both British possessions and foreign, at which rate it remained until 1845, when the duty was repealed. The British territories in India almost entirely supply us with this article, which we export to the colonies, &c.

Cinnamon.—The duty, which in 1826 was 2*s.* 6*d.* per lb. on the produce of British possessions, was reduced in 1829 to 6*d.* on British possessions, and 1*s.* foreign, at which rate it remained till 1842, when a reduction to 3*d.* on British possessions and 6*d.* on foreign took place, since which time there has been no alteration. The British territories in India, and Holland, are the countries from which we import cinnamon. Spain and the Spanish Islands, Mexico, Chili, West India Islands, Italy, and France, are the countries to which we chiefly export this article.

Cloves.—The duty in 1826 was 2*s.* per lb. on the produce of British possessions, and 3*s.* per lb. on foreign. In 1836 the duty was fixed at 6*d.* per lb. for all sorts, at which rate it still remains. The British territories of India, the Eastern Coast of Africa, and Holland, supply us with cloves, which we export to the Hanseatic towns, Chili, and other states of South America, Spain, British North America, &c.

Cochineal.—The duty which, previous to 1825 had been 4*d.* per lb. on produce of British possessions, and 1*s.* on foreign, was reduced to 2*d.* on British possessions, and 6*d.* on foreign, at which it remained until 1839, when it was reduced to 1*s.* per cwt. on all sorts. In 1845, the duty was abolished. We receive our principal supply of cochineal from British settlements in Honduras, Mexico, and Central America; and the British territories in India, Germany, Russia, Holland, Belgium, and Turkey, are the countries to which we export it.

Ginger.—The duty which previously to 1824 was 23*s.* per cwt. on the produce of British possessions, was reduced to 11*s.* 6*d.*, that on foreign ginger remaining at 53*s.* With the exception of a reduction on British possessions to 11*s.* in 1833, no alteration took place till 1842, when the duty was fixed at 5*s.* on British possessions, and 10*s.* on foreign, at which it still remains. We import most of our ginger from the British territories in India, the British West India Islands, and the Western Coast of Africa, and export principally to Germany and Spain.

Gum Arabic.—The duty of 12*s.* per cwt. in 1826 was reduced in 1828 to 6*s.* per cwt. on the produce of British possessions, and 10*s.* on foreign, by Treasury order. In 1832 the produce of all countries was put on the same footing, and a duty of 6*s.* charged on all. In 1842 the duty was reduced to 1*s.* per cwt., and in 1845 was totally repealed. The British territories of India, Egypt, Morocco, and the British possessions in South Africa, supply our market with this article, which we export to the United States of America, Russia, the Hanseatic Towns, Holland, and Belgium.

Gum Tragacanth.—The duty which from 1826 was 1*s.* per lb., was reduced in 1832 to 6*s.* per cwt., and in 1842 a further reduction to 1*s.* took place. In 1845 the duty was repealed. We obtain our supply of this article chiefly from Smyrna, and export it to the colonies and other parts.

Linseeds.—The duty which previous to 1825 was 5*d.* per bushel, was then reduced to 1½*d.*, at which rate it remained till 1842, when it was reduced to 1*d.* per quarter. The duty was repealed in 1845. We receive our chief supplies of this seed from Russia, Prussia, and the British territories in India. The principal export is to the colonies.

Liquorice Juice and Paste.—The duty which previously to 1842 was 75*s.* per cwt., was then fixed for juice, 10*s.* from British possessions; foreign, 27*s.* 6*d.*; for paste, 10*s.* from British possessions, and 20*s.* for foreign. In 1846 the duty was fixed on juice, 10*s.* from British possessions; 20*s.* on foreign, the duty on paste remaining the same as before, at which it still remains. The Papal territories and Spain supply us with liquorice, which we export to the colonies, &c.

Mace.—The duty in 1826 was 3*s.* 6*d.* per lb. on the produce of British possessions, and 4*s.* 6*d.* on foreign. In 1836 the duty was reduced to 2*s.* 6*d.* per lb. on all sorts, at which rate it still remains. The British territories in India, Java, and the Mauritius, supply us with the principal part of the mace imported; whilst the Hanseatic Towns, the United States of America, and Prussia, are the countries to which we export it.

Nutmegs.—The duty from 1826 was 2*s.* 6*d.* per lb. on the produce of British possessions, and 3*s.* 6*d.* on foreign. In 1838 the duty on wild nutmegs in the shell was fixed at 1*s.*, the other sorts remaining as before. After July the 5th, 1843, wild in the shell 3*d.* per lb. duty. From August, 1846, duty on all other kinds 2*s.* 6*d.* per lb., wild in the shell remaining at 3*d.* The territories of British India, Holland, Java, Mauritius, &c., are the countries whence we chiefly import this article, and the United States of America, British North America, Russia, Germany, &c., are the countries to which we export it. The Dutch have used their best endeavours to keep the nutmeg trade exclusively to themselves; the Banda isles belonging to Holland producing upwards of 650,000 lbs. of nutmegs and 160,000 lbs. of mace per annum.

Olive Oil.—The duty, which previous to 1825, was 1*s.* 6*d.* per gallon, was then reduced to 8*d.* In 1828 the duty on oil imported in ships of Naples and Sicily was 9*d.* per gallon; in other ships 8*d.* In 1829 the duty on oil imported in ships of Naples and Sicily was raised to 10*d.* In 1834 the duty was fixed at £10 10*s.* per tun if imported in vessels of Naples or Sicily, and £8 8*s.* if imported in British or other ships; and in 1841 reduced to £4 4*s.* imported in British ships, and £6 6*s.* in vessels of Naples and Sicily. In 1842 the produce of British possessions was charged a duty of 20*s.* per tun; oil the produce of Naples and Sicily, imported in ships of Naples and Sicily, 80*s.* per tun; in British or other vessels 40*s.* per tun. In 1845 the duty was repealed. We import chiefly from Naples, Sicily, Malta, Spain, and Tuscany; and export to the colonies, &c.

Opium.—The duty, which in 1826 was 9*s.* per lb., was in 1838 reduced to 4*s.*, and in 1841 to 1*s.*, at which it still remains. Turkey and Egypt are the countries whence we obtain this drug; and Holland, the United States of America, China, British territories of India, Russia, &c., are those to which it is principally exported.*

Pepper.—The duty, which was reduced in 1826, from 2*s.* 6*d.* to 1*s.* on the produce of British possessions, and from 2*s.* 6*d.* to 1*s.* 2*d.* and 1*s.* 6*d.* on foreign, was fixed at 6*d.* per lb. for all sorts, at which rate it still remains. The British territories of India, Java, and the western coast of Africa supply us with pepper; which we principally export to Russia, the Hanseatic Towns, Holland, Turkey, Austria, Brazil, and British North America.

Pimento.—In 1825 the duty was reduced from 10*d.* to 5*d.* per lb. on the produce of British possessions; the duty on foreign being 1*s.* 3*d.* per lb. In 1836 the duty was fixed at 3*d.* on all sorts, and in 1842 at 5*s.* per cwt., at which it still remains. We are supplied with pimento from the British West India Islands. The places to which we export it are the Hanseatic towns, Prussia, Holland, and Belgium.

Quicksilver.—The duty, which was reduced from 1*s.* 8*d.* per lb. to 6*d.* in 1825, by Treasury order, was fixed, in 1832, at 1*d.* per lb. In 1845 the duty was repealed. Our supply of quicksilver has been derived almost exclusively from Spain, with a small import from Austria. In future we may expect large supplies from California. We export principally to Chili, Peru, Mexico, &c., for mining purposes (for extraction of silver by amalgamation process), United States of America, British territories of India, France, and the West Indies.

Rhubarb.—In 1832, the duty which had previously been 2*s.* 6*d.* per lb. on the produce of British possessions, and 2*s.* 8*d.* on foreign, was reduced to 1*s.* per lb. for all sorts; and in 1842 further reduced to 3*d.* per lb.; and repealed in 1845. China, British territories of India, and Russia, principally supply us with rhubarb, which we export to the United States of America, the Hanseatic towns, Holland, Belgium, and the Italian States.

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* In many of the annual returns made by the Board of Trade to Parliament, the duty is stated at 9*s.* long after the reduction to 4*s.* had taken place.

Sago.—The duty, which was 74*s.* 8*d.* per cwt. in 1823, was, in 1825, reduced to 30*s.* per cwt. on pearl sago and sago powder, and 15*s.* per cwt. on common sago. In 1826 the duty on common sago was reduced to 5*s.* per cwt. In 1828 the duty on pearl sago and sago powder, the produce of British possessions, was fixed at 20*s.*, and foreign 30*s.* per cwt. The duty on common sago, British possessions, was fixed at 1*s.*, and foreign at 5*s.* per cwt. In 1829 the duty on pearl sago and sago powder, British possessions, was reduced to 10*s.*; foreign 15*s.* per cwt.; the duty on common sago remaining the same. In 1833 a duty of 1*s.* on the produce of all countries was levied, which remained to 1846, when it was reduced to 6*d.* per cwt., at which it still remains. The territories of British India supply us with sago, which we export to the colonies.

Saltpetre and Nitrate of Soda.—A duty of 6*d.* per cwt. was paid from 1826 to 1846, when the duty was repealed. The territories of British India furnish us with saltpetre; and Chili and Peru with nitrate of soda; which we export to the Hanseatic towns, Austria, Russia, &c.

Shellac.—Previous to 1832 the duty was 20 per cent. *ad valorem*; it was then reduced to 6*s.* per cwt. In 1842 the duty was reduced to 1*s.* per cwt., and in 1845 repealed. The British territories of India supply us with this gum, and the countries to which we export it, are the Hanseatic towns, Russia, Holland, and the United States of America.

Sulphur.—The duty was reduced in 1826 from 15*s.* per cwt. for unrefined, to 6*d.*; from 20*s.* to 6*s.* for refined, and from 23*s.* 9*d.* to 9*s.* 9*d.* for flower of sulphur. The drawback on sulphur used in the manufacture of oil of vitriol now ceased. This drawback amounted in 1825 to £118,830. In 1842 the duty was reduced to 3*d.* for unrefined from British possessions, and 6*d.* for foreign; 1*s.* for refined, British possessions, and 2*s.* for foreign. In 1849, the duty was repealed. The volcanic districts of Naples and Sicily supply us with sulphur. In the autumn of 1838, the Sicilian government having granted a monopoly of sulphur to a Frenchman, and the price having risen from £7 to £14 per ton, the importation fell off one-half, the manufacturers of sulphuric acid, who are the principal consumers of sulphur, using the sulphurets of iron and copper (pyrites) found in great abundance at Wicklow, Cornwall, and other places in our own country, as a source of sulphur. Although the monopoly was soon abandoned, and the trade thrown open as before, the importations of sulphur have not risen to so great an extent as they would have done, had not the folly of the Sicilian government taught us how to be independent of them for supplies of this article.

Wax (Bees'.)—The duty, which previously to 1823 was 66*s.* 6*d.* per cwt. on unbleached, and 123*s.* 6*d.* on white, was then reduced to 46*s.* 6*d.* unbleached, British possessions, and 66*s.* 6*d.* foreign; white remaining as before. In 1828 the duty on unbleached, British possessions, was reduced to 10*s.*, foreign remaining at 66*s.* 6*d.*, but admitted by Treasury order at 30*s.*; white, British possessions, 20*s.*; foreign, 123*s.* 6*d.* In 1829 the duty on unbleached, from any British possession in Asia, Africa, or America, was fixed at 10*s.*, from other parts 30*s.*; the duty on white from any British possession in Asia, Africa, or America 20*s*; from other parts 60*s.* In 1842 the duty was reduced on unbleached, British possessions, to 1*s.* per cwt.; foreign, 2*s.*; white, British possessions, 10*s.*; foreign, 20*s.* In 1845 the duty was repealed. We obtain our chief supply of foreign wax from the coast of Africa, the East Indies, and Hamburgh, and export it to the colonies, &c.

NOTE.—In addition to the rate of duty above-mentioned, a further sum of five per cent. is charged on all articles liable to Customs' duty.

	ALMONDS.			BARK, PERUVIAN.			SHELLAC.			LINSEEDS, &c.			LIQUORICE, JUICE AND PASTE.			PIMENTO.		
	Imported	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.
	cwts.	cwts.	cwts.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	bushels	bushels	bushels	cwts.	cwts.	cwts	lbs.	lbs.	lbs.
1826	6,314	2,778	1,156	178,941	245,540	106,885	470,330	214,480	534,240	2,153,077	2,422,122	1,261	6,730	4,738	51	1,564,469	330,473	1,428,739
1827	11,754	3,409	3,677	385,690	61,314	173,451	461,477	233,744	345,033	2,374,855	2,407,052	10,564	9,179	5,586	69	2,235,350	319,667	2,005,252
1828	16,891	3,985	6,848	338,797	43,240	188,669	497,475	242,704	352,162	1,996,414	1,965,660	72,620	6,628	5,498	120	2,269,545	310,182	1,677,922
1829	8,152	3,250	2,904	405,552	97,110	296,382	703,886	217,512	446,598	2,052,258	1,899,936	95,342	4,440	4,390	50	3,599,268	339,013	2,732,493
1830	12,920	2,837	5,861	556,290	53,350	371,261	692,458	245,056	111,820	1,990,971	2,062,938	25,843	4,808	4,534	42	3,528,104	348,525	2,262,951
1831	15,022	3,386	8,706	225,678	112,773	137,578	1,183,058	552,389	687,281	2,759,103	2,476,990	143,968	8,873	6,002	120	1,810,616	304,400	1,815,537
1832	13,246	7,129	6,250	356,998	nil.	294,849	1,332,590	404,766	772,712	1,995,072	2,013,034	94,727	5,769	6,006	150	1,710,960	296,121	1,704,177
1833	15,891	6,325	11,338	253,767	49,525	339,908	871,766	488,521	442,224	2,179,135	2,222,967	652	7,783	6,739	224	4,844,973	330,245	2,810,384
1834	19,894	5,967	11,293	627,983	87,763	360,171	1,032,918	481,701	533,930	2,210,237	2,211,968	7,523	6,071	6,141	107	1,396,773	322,751	1,799,143
1835	16,817	7,170	8,706	416,410	120,892	212,786	1,185,855	584,787	581,256	2,206,748	2,159,498	21,078	6,414	7,319	167	2,536,353	344,458	2,462,485
1836	17,370	8,061	8,814	414,688	113,097	31,732	1,454,355	576,332	685,300	3,339,215	3,179,097	1,371	7,754	7,643	515	3,269,238	400,914	2,337,982
1837	14,858	7,940	8,020	465,522	150,072	54,326	2,217,679	574,273	574,391	3,321,089	3,381,643	6,879	7,524	7,899	201	2,113,300	335,406	1,376,645
1838	21,649	7,179	11,229	384,751	112,989	101,838	2,660,948	828,302	1,389,662	3,304,869	3,136,695	146,926	6,782	7,329	367	905,888	339,726	807,539
1839	28,261	9,785	19,734	42,658	13,834	248,150	3,196,287	786,893	1,414,506	4,151,047	3,852,359	118,856	8,207	6,799	629	1,076,925	309,164	839,173
1840	27,566	7,935	21,053	76,049	43,705	118,461	2,828,819	674,671	2,133,654	3,558,070	3,256,257	264,295	7,067	6,905	313	1,013,400	339,319	1,280,682
1841	11,089	8,104	5,641	210,155	50,669	229,152	3,254,272	871,584	1,643,936	2,907,685	2,643,286	526,429	7,179	7,004	590	797,765	297,183	967,170
1842	21,335	9,364	6,277	126,000*	78,288	406,560	557,088	1,075,536	1,519,616	2,941,600	2,773,768	193,800	14,208	8,690	388	1,820,000	453,152	1,422,512
1843	15,688	10,560	10,414	312,928	42,112	450,688	3,112,480	801,360	1,381,500	3,764,312	3,679,804	138,584	10,535	10,312	1,424	3,119,040	401,296	2,374,400
1844	20,605	9,763	7,631	236,880	12,582	255,024	1,665,776	1,126,832	793,968	4,935,576	4,745,480	192,656	11,258	10,407	2,641	298,032	339,808	608,160
1845	16,846	9,346	7,628	568,736	—	447,888	2,516,752	—	1,117,200	5,254,344	—	259,888	15,642	10,860	3,601	3,002,384	489,104	2,490,992
1846	21,520	9,868	7,498	739,312	—	433,888	1,058,288	—	746,480	4,049,128	—	238,424	13,323	11,319	4,082	935,984	384,608	793,296
1847	24,742	S. 8,632	10,876	768,544	—	781,088	967,344	—	747,376	3,516,096	—	81,272	18,763	11,806	4,445	1,358,560	367,248	872,704
1848	27,420	S. 10,971	11,722	276,416	—	288,064	1,608,544	—	923,316	6,397,200	—	74,192	11,768	8,926	2,929	2,325,576	471,444	2,081,408
1849	32,038	S. 9,624	16,953	737,744	—	407,568	1,676,032	--	1,068,144	5,011,960	—	128,608	11,291	9,698	1,567	2,804,144	381,024	2,273,936
1850										4,871,888	—					2,290,176	399,168	953,120

An entry for home consumption is required at the Custom House only in the case of such goods as are liable to duty. Of those articles, therefore, upon which the duty has been wholly repealed, the "quantities retained for home consumption" have ceased to be ascertainable.

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* The apparent discrepancy existing between the large amount of bark imported and that exported, in this year, is explained by reference to the imports, &c., of previous years, by which it will be seen, that the stock on hand, at the commencement of 1842, would be amply sufficient to supply the quantity exported in that year. These remarks equally apply to similar apparent discrepancies under other heads in the tables.

THE COPYRIGHT OF A PHARMACOPŒIA.

TO THE EDITOR OF THE PHARMACEUTICAL JOURNAL.

Dear Sir,—The opinion on the question of Pharmacopœial copyright, as recorded in your last number, is perfectly sound. The subject is a *quæstio sæpius vexata*, from the time of Henry VIII. to the present period. The very essence of the charters of the three ancient kingdoms will shew, that both the men and their recipes were aggregated only for the public good, not intended to lose their individual independence and common-right character, but to be collected for public convenience and again to be distributed, through that public from whence they were derived. The men gathered from the public under the law were incorporated into a college; the recipes derived from a thousand sources, from the same public, were collected into a book: both still remained individually subservient to the public, and were necessarily indebted to public criticism and private experience, for any gradual advance towards perfection. When the Pharmacopœia, as a national document, is passed through Council, there is always a distinct clause embodied in the order in Council authorising any Physician to exercise his discretion in altering the formulæ. Whatever might have been the animus of the London College at the time I brought out my edition of 1838, the late Sir Henry Halford, although President, did in his private capacity peruse the sheets as they went through the press, and transmitted to me his written opinion of my labours. At an earlier period of the London College, a former President threatened Culpepper with a prosecution for re-printing their formulæ. No doubt he felt, as every individual must feel, that it is a very disagreeable position to find a whole body of educated gentlemen of the faculty, systematically arrayed against him as an offender. Any profit by book speculation would be a poor salvo for such an invidious task. A higher principle could alone sustain a man in so unequal a conflict. Let us see then what Culpepper said to the President, and we shall look in vain in our own time for any man of equal sense, wit, courage, and uncompromising independence in the service of the public. "Your copyright!" quoth Culpepper, "what senseless impudence! As if a fading old beau, beggarly, and not over clean, should deck himself bravely in Monmouth Street, borrowing a tawdry coat at one shop, a figured-waistcoat, points and hose at another, his breeches, shirt, and ruffles at a third, snatching up here and there, silks, kerchiefs, shoes, gold buckles, and other finery, and having completed his dress with the requisite externals of foreign and home manufacture, should whisk up a gold-headed cane, coax a barber to dress a bag-wig for his *caput semi-mortuum*; and upon the strength of two pennyworth of scent, of Bucklersbury, the only thing he cares to pay for, should strut down the Mall with all the pride of a peacock, threatening to lay by the heels any and everybody, who should doubt that the suit is verily and indeed his own, although the articles may have been so long on town, that some who meet him can recognize their dingy gold lace of old fashion, and give their history through generations of backs on which they have sat by no better tenure." I quote from memory and from Culpepper's preface to his folio work on Pharmacy. *Pace tantorum virorum*, with a high respect for the majority, and with good wishes to all, I think anything that I have ever said is vapid and submissive in comparison with this bit of pungent truth. You will only do me justice by thus allowing me to notice that I am not the first transcriber of a Pharmacopœia, nor the first to assert the common-right character of its materials. The question has been noticed a hundred times throughout three centuries, nor did the London College ever dare to go beyond threats, either with Nicholas Culpepper, Gent., or with

Your humble servant,
Geo. Fred. Collier.

32, *Spring Gardens, March* 10, 1851.

TO CORRESPONDENTS.

A Druggist (Wolverhampton.)—*Volatile Tincture of Sulphur*, London and Edinburgh Dispensatory, 1765.—Take of flowers of sulphur, six ounces; sal ammoniac, one pound; quicklime, a pound and a half. Slake the lime, and grind it first with the sulphur and afterwards with the sal ammoniac, in small quantities at a time; then distil the mixture in a retort, with a fire gradually increased.

A Member (Worcester.)—*Wright's Pearl Ointment.*—See vol. iii., p. 115.

A Member (Plymouth.)—We believe Brazil wood and alum are used for staining ivory red.

W. W. F.—*Aqua Lactucæ.*—The Paris Codex orders the following:—Fresh lettuces, bruised, 10lbs.; water, 20lbs.; distil 10lbs. It is sometimes made by dissolving the extract in the proportion of one grain to the ounce of distilled water.

Omega (Malmsbury.)—*Horticultural Ink.*—Chloride of platinum, five grains (misprinted five drachms in a former notice); distilled water, one ounce; dissolve.—See vol. ix., p. 280.

Mr. Winter (Salford.)—Mr. Winter was answered by post, and the letter was returned through the Dead Letter Office.

Pharmacon (Leeds.)—*Extractum Sarzæ Liquidum.*—A formula will be found in the new London Pharmacopœia.

Pharmaceutist.—We have not observed the turbid appearance alluded to, but think probably filtration would remove it.

A Member (Bolton) wishes a formula for "Washing Liquor." Does he mean for linen, sheep, or what?

A. P. S. (Kidderminster.)—The communication and enclosure have been received.

Mr. Parsons inquires why we decline to give an Apprentice instructions for making gunpowder?—Because we decline the responsibility of encouraging him to blow up his master's premises. The question has no relation to Pharmacy.

A Registered Apprentice.—(1.) Noad's Lectures on Electricity.—(2.) No.

Several correspondents wish to know when the remaining portion of Dr. Pereira's Materia Medica will be ready for delivery?—We are unable to answer the question.

Alpha.—(1.) Oxygen and nitrogen are mechanically mixed in the atmosphere, not chemically combined.—(2.) The term *atom* is a figure of speech used to represent an equivalent: there are simple and compound atoms.

A Registered Apprentice (Bolton.)—All the questions may be answered by reference to any elementary work on Chemistry, such as Fownes's Manual of Chemistry.

Anti-Slavery.—The subject has been discussed in this Journal (see vol. vi., p. 246), and we have nothing to add.

W. E. L. (Cheltenham.)—A Chemist is not liable to a penalty for going out to perform the minor operations in surgery; but he is liable to a coroner's inquest—verdict, manslaughter—in case of accident arising from his undertaking that for which he is not qualified.

B. S. P., S. C.—The quantitative determination of sugar in urine is effected by fermentation.—See Bowman's Medical Chemistry.

J. B.—(1.) Yellow bark yields from one to four per cent. of quina.—(2.) The microscope is the best test for Bermuda arrow-root.—(3.) What is called *Socotrine aloes* should be used in the preparations of the Pharmacopœia. (4.) Yes.—(5.) One is a carbonate, the other chiefly a caustic alkali.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Advertisements to Mr. Churchill, Princes Street, Soho.

Other Communications to the Editor (to the care of Mr. Churchill).

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. XI.—MAY 1st, 1851.

THE GREAT EXHIBITION.—CHEMISTRY & PHARMACY.

In the completion of so extensive and complicated an undertaking as the Great Exhibition of 1851, it is not surprizing that delays and disappointments have occurred, and that arrangements which ought to have been completed by the first of April are still, at the time we are going to press, nearly a month afterwards, in an unfinished state. We have not had an opportunity of inspecting all the articles sent for exhibition in the Chemical and Pharmaceutical department, many of which, especially the foreign specimens, at the time we are writing, are not yet arranged. In the British Chemical section, there is no cause for disappointment. On the contrary, our expectations are, in some respects, more than realized.

The display of crystallized substances is remarkably striking, and calculated to attract the attention of non-professional, as well as professional, visitors. The most prominent specimens consist of sulphates of iron and copper, red and yellow prussiate of potash, alum, sulphur, chromates of potash, acetate of lead, citric and tartaric acids, Rochelle salts, stannate, carbonate and bi-carbonate of soda, muriate and carbonate of ammonia, gallic and tannic acids, the salts of morphia, strychnia, &c. Some of these specimens are remarkable for their size and the massive proportions of the crystals, others on account of the intrinsic beauty and perfection of the crystallization, their apparent purity, or their brillancy of colour.

But there are many other specimens which, in a scientific point of view, possess more interest than those which at first attract the notice of the visitor. For example, a series of preparations, the products of sea-weed and kelp, showing iodine in various degrees of purity, and its salts in their several crystalline forms. Similar series of preparations of iron, of mercury, borax, antimony, alum, camphor, &c. We observed very fine specimens of benzoic acid, phosphorus, nitrate of uranium, silicate of potash, chromate of potash, chromic acid, emetic tartar in beautiful characteristic crystals, a series of valerianates, chloride of barium, acetate and sulphate of zinc, cantharidin, aloin, bebeerine, caffein, kreatine, kreatinine, urea, uric acid, hippuric acid, &c.

There is no indication of any preconcerted arrangement among the manufacturers to furnish a classified collection of all the salts and other compounds used in medicine, the arts, and manufactures. We find many multiples of some articles, from which it would appear that each manufacturer has emulated his neighbours in furnishing the specimens his laboratory was best calculated to produce, and this competition in excellence has led to a satisfactory and creditable result.

In the Materia Medica department, the most striking feature is an extremely interesting collection of cinchona barks, arranged and identified according to the most recent and authentic information. There is also a choice collection of dried medicinal plants in a surprising state of preservation. The London Druggists' contribution contains some interesting specimens, but is limited in extent, and much less complete than was originally contemplated.

Of Pharmaceutical preparations, strictly so called, there is not much attempt at display; a few tinctures, extracts, syrups, prepared juices, concentrated infusions, and essential oils, are the principal objects which we observed.

A few quack medicines have obtained admittance, contained in bottles and wrappers, with the name of the inventor, and the virtues of the nostrum outside—a kind of advertisement which does not add to the credit of the exhibition. There is also an article called "crystallized pyreticks, or artificial vital electric salts," mysteriously displayed by the side of a specimen of microscopic crystals, stated to be identical with it and obtained from human flesh. We suspect the salt is ammonio-phosphate of soda, admitted by some oversight, under a fictitious name.

We cannot pretend, on the present occasion, to give more than a very cursory sketch of the general nature of the exhibition, pointing out some of its most interesting features, with two or three exceptional cases, in which the object of the exhibition has been perverted.

In this imperfect notice, we purposely omit to mention the names of any of the exhibitors. Our remarks only apply to the British part of the exhibition, and even here, in the confusion necessarily existing during the arrangement of the articles, some of which had not been uncovered, it would have been impossible to do justice to all parties.

A valuable collection of specimens, some of which are very curious, have been sent from India; but not having had an opportunity of examining this part of the collection, we defer the notice of these and other colonial and foreign productions until next month, when we intend to give a more detailed report of the Chemical and Pharmaceutical products generally.

THE TENTH ANNIVERSARY OF THE PHARMACEUTICAL SOCIETY.

Among the numerous visitors who will, during the present month, be attracted to the metropolis by the Great Exhibition, it is not improbable that many Members of the Pharmaceutical Society may be included. To those who entertain this intention, we suggest the advantage of endeavouring to regulate the time so as to make their visit subservient to another object. The Annual Meeting of the Pharmaceutical Society is to be held on Tuesday, the 20th of May, and the President's Conversazione on the previous evening.

We shall not anticipate the Report of the Council, by discussing the several topics likely to be brought before the Meeting in reference to the state and prospects of the Society, and the progress of Pharmaceutical improvement in this country; but those who take an interest in the progressive advancement of British Chemists and Druggists, and desire to promote the permanent union of the entire body, should embrace every available opportunity of meeting their brethren on occasions of this kind. It will be competent for any Member present to offer his opinion on subjects arising out of the Annual Report, with such suggestions as he may think desirable.

THE ARSENIC BILL.

This Bill, having passed the first and second readings in the House of Commons, was introduced into Committee on the 15th of April, *pro formâ*, with the intimation, on the part of the Secretary of State for the Home Department, that it would be reprinted with some verbal corrections, and again brought before the House in its amended state prior to the third reading.

The alteration required is in the second clause, which is obscurely worded, and for which it is proposed to substitute the following:

> II. No person shall sell less than ten pounds weight of Arsenic at any one time to any person who is unknown to the person selling such Arsenic, unless the sale be made in the presence of a witness who is known to the person selling the Arsenic, and to whom the purchaser is known, and who signs his name, together with his place of abode, to such entries, before the delivery of the Arsenic to the purchaser; and no person shall sell less than ten pounds weight of Arsenic at any one time to any person other than a male person of full age.
>
> III. No person shall sell any Arsenic, unless the same be, before the sale thereof, mixed with soot or indigo, in the proportion of one ounce of soot or half an ounce of indigo at the least to one pound of the Arsenic, and so in proportion for any greater or less quantity: provided always, that where such Arsenic is stated by the purchaser to be required, not for use in agriculture, but for some other purpose for which such admixture would, according to the representation of the purchaser, render it unfit, such Arsenic may be sold without such admixture, in a quantity of not less than ten pounds at any one time.

An alteration is also desirable in the third (now the fourth) clause, which permits the wholesale purchaser to buy arsenic in quantities of NOT LESS THAN 100 *lbs.* WEIGHT; the effect of which provision would be to oblige many persons to purchase several times the quantity they require.

THE APPOINTMENT OF OFFICERS OF HEALTH UNDER THE PUBLIC HEALTH ACT.

It has for some time past been in contemplation to appoint, in various districts, officers of health or medical inspectors, a kind of "preventive service" against epidemics. The proposition on the face of it is a rational one. Public attention has of late been increasingly directed to sanitary regulations; and the value of judicious professional assistance, medical and chemical, in regard to the reforms to be carried out, and the precautions to be adopted, cannot admit of a doubt.

The nature of the duties to be performed by such functionaries, is a matter requiring serious consideration, and the conclusion at which the Board of Health has arrived, is embodied in a document recently published, containing thirty clauses, in which the said duties are defined with microscopic precision. No person acquainted with the style and policy of Mr. Chadwick, could entertain any doubt as to the paternity of the effusion. He has made the PLACE, it now remains for him, like Frankenstein, to make a MAN to fill it.

The "model officer of health," is to be a medical practitioner, experienced in the prevention, treatment, and cure of epidemics, and all contagious diseases. He must be a chemist, expert in analysing food, water, and other agents capable of influencing health. He must be specially skilled in ventilation, drainage, and cleansing, the water supply, and medical jurisprudence. He must possess the "pen of a ready writer;" the power of accumulating, arranging, and tabulating facts, and manufacturing reports. His duties are ubiquitous and interminable. He is to give instructions for the removal or prevention of causes of disease, and in certain cases to assist in their treatment or cure. He must be constantly on the look out for cases of fever and other contagious disorders. Like a vulture, he must hover about in search of dead bodies, and when he has found one (if contagion be suspected) he must ascertain by house to house visitation or otherwise, whether any of the neighbours "have died or are affected;" in other words, he must spread a panic in the neighbourhood. He is to give instructions, take measures, carry out investigations, maintain a constant communication with the inspector of nuisances, and report progress, enforce vaccination, inspect crowded dwellings, order the removal of bodies and summon the coroner in case of need, give directions respecting the sort of coffin to be used, the time and mode of burial, the application of disinfectants, the purification of drains, and numerous other matters and things too tedious to be mentioned. In his inspection of factories and schools, he must take notes of a great variety of circumstances, and give instructions on as many subjects, and where disease exists, he must examine every corner of the house, and ask innumerable questions. Drains and cesspools, slaughter-houses, ponds, ditches, and canals, are to be under his superintendence, and he is especially to watch over courts, alleys, and small tenements, by night and by day, and perform all duties imposed on him by any bye-laws of the local Board of Health. He is to keep a diary and register, and to make a report quarterly, or oftener if required, respecting sickness and death, or any other matters relating thereto. Even "the emission of any offensive or noxious smell" is to be reported to the Local Board of Health! He shall also "prepare annually a printed report and tabular return of the ascertained sickness as well as mortality of the district for the year" (with a complicated series of statistical particulars) copies of which are to be furnished to the General Board of Health and other official authorities.

The above is a condensed and consequently an imperfect statement of the duties to be performed by the "model officer of health." We are not informed how many of these officers are to be appointed for the entire kingdom, or what is to be the amount of their salaries: neither does the document before us state the salaries of the "inspectors of nuisances," and other functionaries who are to perform the subordinate duties. But the entire project is recommended as "a great pecuniary economy," under the fallacious notion that it will prove a panacea for "all the ills that flesh is heir to."

It is much to be regretted that so laudable and useful an undertaking as sanitary reform should be thrown into ridicule by visionary speculations of this description, by means of which practicable proposals are thrown into the shade, and the real object frustrated. On this account the late Act for the prevention of intramural interment is at the present time a dead letter, the machinery being so complicated and unwieldy, that it will be the work of many years to set it in motion, while the abuses which it was intended to remove continue unabated.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

PHARMACEUTICAL MEETING,

Wednesday, April 9th, 1851,

MR. INCE, PRESIDENT, IN THE CHAIR.

DONATIONS TO THE MUSEUM.

The following donations to the Society's Museum were announced :—

Specimen of genuine Bear's Grease, taken from a grisly bear that died at the Zoological Gardens, from Dr. Pereira.

Specimen of Tonca Beans, from Messrs. Merry and Son, Fenchurch Street.

A Mass of native Asbestos, and a series of Specimens illustrating the manufacture of Animal Charcoal, with its products, presented by Mr. Charles Parker, from the manufactory of Mr. F. Parker, of Gravel Lane.

Some specimens were also placed on the table, prepared by Mr. Parker, who is a student in the Laboratory, to illustrate the Botany of the Commercial Sennas. A branch of the tree being drawn on paper from a botanical work, the leaves, fruit, &c., selected from specimens of senna, were stuck on the paper so as to give the appearance of a dried botanical specimen. Different species of senna, and the argel were thus prepared.

Seeds of *Lecythis Zabucajo* from Guiana, from Mr. Daniel Hanbury.

The following notice of these seeds appeared in Hooker's *Journal of Botany*, Jan. 1849 : —

ZABUCAJO,

A NEW ESCULENT NUT, RECENTLY IMPORTED.

In the museum of the Royal Gardens, may be seen some nuts or seeds under the name of *Zabucajo*. They were brought to us a few days ago, by our friend Mr. Purdie (lately engaged on a botanical mission to New Granada, now in charge of the Botanic Garden, Trinidad) from Edinburgh and Glasgow. His attention was first directed to them at the fruiterers' shops in Edinburgh, where he learned that they were already rather extensively imported from Para to Glasgow, and much used at table with the dessert. In size and shape, the seeds are not much unlike the so-called Brazil-nuts (seeds of *Bertholetia excelsa*) they are equally covered by a hard coat, but are more irregular, and are longitudinally furrowed. This led to a comparison with the fruits of allied plants in the museum, and it was easy to see that the seeds belonged to a species of *Lecythis*, and all doubts were removed on referring to Aublet, and finding the identical species described as *Lecythis Zabucajo*. It is there remarked that the seeds are much eaten by the colonists in French Guiana, being sweet and delicate, and considered preferable to the almonds of Europe, an opinion in which we are quite disposed to agree. On account of the excellency of the seeds, the French Government, much to their credit, introduced the cultivation of this tree into the Mauritius, nearly a century ago, and in 1761, Aublet tells us the plants were then in a flourishing condition. Happy would it be for our colonies, and for the British West Indian islands in particular, if the introduction and cultivation of useful plants, suited to the respective climates, were, in like manner, encouraged by the British Government.

The entire fruit in question, is, like all the *Lecythideæ*, highly curious;

it is six inches and more long, and about four wide, of a thick and woody texture, opening at the top like a box, with a transverse lid, from the upper side of which lid, a woody column descends to the bottom of the inside of the fruit, and around this column the large seeds are arranged. This and other species of the genus are called in French Guiana *Marmite* (porringer) *de singe*, partly because the monkeys have the good taste to show a fondness for the kernels, and partly from the use made by the negroes of the emptied capsules (the lid being removed) wherewith to entrap these wily animals. The mouth, it will be observed, of the capsule, is narrower than the inside; this being filled with sugar, and laid in a place frequented by monkeys, they grasp the sugar, and by this means enlarge the paw so as to be unable to extricate it, while their greediness forbids the opening of the paw and loss of the sugar. The heavy fruit of the *Zabucajo* prevents the escape of the animal, who is pursued and taken in this monkey-trap.

The following communications were made:—

ON SUPERPHOSPHATE OF IRON:

A NEW REMEDIAL AGENT.

Mr. Thomas Greenish drew the attention of the meeting to a preparation of iron, which has been introduced to the notice of the medical profession by Dr. Routh, in a paper read before the Medical Society in January last. He was induced to bring the subject before the Pharmaceutical Society as the preparation alluded to was prescribed by several medical men, and it appeared the method of preparing it was not generally known. The process is thus described by Dr. Routh: Add as much phosphate of iron to solution of metaphosphoric acid as the latter, in a boiling state, will take up, and allow it to cool. The solution thus obtained is of a semi-transparent greenish or slaty hue. It hardens on exposure to the air, so as to acquire a pilular consistence, or it may be mixed with liquorice powder so as to give it this consistence at once. It is soluble in water in all proportions, and is free from any disagreeable or inky taste.

Mr. Greenish had also prepared a syrup of this salt, which contained five grains of the salt to one drachm of syrup.

ON THE MEDICINAL PROPERTIES OF THE GUACO.

BY P. L. SIMMONDS, ESQ.

At a time when cholera has been committing great ravages throughout our West India Colonies, I beg to bring under the more general notice of the profession a remedy which has been effectually tried and found useful in several quarters. The "Bijuco de Guaco," the *Mikania Guaco*, a creeping plant, native of South America, but now naturalized among the Antilles, has long been held in repute as an antidote to the bite of snakes; its medical properties have not, however, hitherto been fully described. There are several species of Eupatorium closely allied to this guaco, and many varieties of the Mikania, so that among fifty or sixty of them it is difficult to identify the true medicinal guaco, or that which is here specifically recommended.

The leaves of the best sort are stated to be heart-shaped, from four to six inches long, by two or three broad, the edges slightly curved and a little notched, of a fine dark green on one side and of a light purple changing colour on the other. The leaves and stem are pubescent, and have a very bitter pungent taste. There are two principal kinds, distinguished by the flowers, those of the one being pale yellow and the other white. The former is preferred.

Some years ago Mr. Henry Vendryes delivered a lecture before the Jamaica Physical Society on the virtues of the plant. It was first introduced into use for its medical properties by Don Andres Diaz, of Havana, and Dr. Chabert, of that city, described its curative properties in cases of cholera in the *Diario de la Habana*. In a pamphlet published by Don Andres Diaz he says—

> "The preventive virtue of the guaco against all poisons is undeniable. My own estate having been visited by that awful scourge (the cholera) on the sixth day I found that twenty-eight of my people had died, and that twenty-two were in the hospital, all in the last stage of cholera. Seeing that, notwithstanding the treatment recommended by our medical faculty, our people were dying almost as soon as they were attacked by the malady, it struck me that by adopting the proposed remedy I might have a chance of saving many of my fellow-creatures. I determined on trying it; I picked out three of the worst cases, and from the first dose which I gave them I began to observe its efficacy in producing the necessary reaction. At the same time that I gave the guaco to the sick, I caused the healthy also to take it, so that the malady soon ceased."

The author then gives a few statistical returns, which prove authentically that out of 400 persons who were attacked with cholera, on four plantations surrounding his own, and on which the guaco was used at his recommendation, only twenty-five died, several of these from the remedy having been applied too late.

Three modes of administering it have been recommended:—

First, Combined with sulphuric acid, prepared in the following manner:—To one ounce of the boiled mucilage add four ounces of sulphuric ether, put into a well-corked bottle. Infuse for three or four hours and it will be fit for use. The mucilage is prepared by triturating in a mortar two ounces each of the stem and leaves of the plant, and boiling for one hour in a pint of water, straining the residue through a cloth, and expressing well the juice with the fingers. The mucilage is to be used cold when combined with the sulphuric ether.

Secondly as a *ptisan*, prepared the same way as common tea, by infusing 1 oz. of the leaves and stem in a pint of boiling water; or by boiling the same quantities, if a strong decoction be required. The leaves and stem should be triturated before boiling or infusion.

Thirdly as an elixir, prepared in the following manner:—Into four gallons of strong proof rum (17° if possible), put three pounds of stems and leaves of the plant, well triturated in a mortar, and after twenty-four hours infusion, it will be fit for use. When the quantity has been reduced one-half, an equal proportion of spirits may be added. It must be used as strong as possible, or it is not to be depended upon for use internally, but may answer for baths. In case of the best sorts being obtained, it may be substituted for the sulphate of quinine, when the latter cannot be procured, and successfully in many other cases, I have no doubt, as a powerful tonic. Indeed the valuable properties it possesses, like those of the Cedron are comparatively little known.

The genus *Mikania* was established by Willdenow, and the celebrated

Mutis, of Santa-Fe, first made known its medical properties as an antidote against the bite of certain serpents. Humboldt and M. Bomplandt have confirmed the powerful virtues of the plant.

The whole plant exhales a strong penetrating and nauseous odour. The bruised leaves are applied exteriorly to wounds. M. Mutis was desirous of ascertaining if inoculation with the guaco would render a person obnoxious to the bite of serpents for a lengthened period, but was prevented from completing his experiments by the refusal of the Grand Court of Justice at Santa-Fe to allow him to make them on criminals condemned to death. The negroes who wish to protect themselves against snake bites take the following precautions:—They make two incisions on the feet, two on the hands, and one on each side of the chest. They express the juice of the leaves of the guaco, which they pour on the incisions, as if inoculating. Before the operation they make the patient drink two spoonfuls of the juice, and they recommend his doing the same five or six times a month, to continue the virtues;—one of the leaves of the plant is usually carried about the person, and the odour is said to have a stupifying effect on the reptiles.—*Alibert's New Elements of Therapeutics*, p. 500.

5, *Barge Yard, City, April* 8, 1851.

SOME PRACTICAL OBSERVATIONS UPON THE FORMATION AND GROWTH OF CRYSTALS.

BY MR. WM. COPNEY.

In the following paper it is not contemplated to indicate or explain the methods by which these substances are prepared upon the large scale, but to offer to the chemical and pharmaceutical student some suggestions, whereby, when the subject of crystallography comes under his notice, he may be enabled to prepare for himself the great majority of those salts whose forms he is called upon to understand.

It may not, therefore, be out of place, to introduce the subject by a brief statement of the modern mode of classifying these bodies.

Crystalline forms are collected into six groups or systems.

These are comprehended by two classes. To the first belong all those whose *axes* are of equal length, and at right angles to each other; to the second, those, the axes of which are of unequal length, and are not always at right angles to each other.

Class 1. *The Equiaxed.*—Contains one system only, the Cubical or Regular, and to which a very large proportion of chemical and pharmaceutical salts belong. Common salt, alum, and iodide of potassium may be mentioned as examples. There are those who maintain that all the metals partake of the forms of this system.

Class 2. *The Unequiaxed.*—Here are included the remaining five groups, which are not improperly subdivided into α the dimetric, and β the trimetric.

To the dimetric belong the second system, or the square prismatic, which calomel, percyanide of mercury, and ferrocyanide of potassium serve to illustrate; and the third or rhombohidric, of which we have an example in calcareous spar.

The trimetric contains the fourth or right prismatic, of which sulphate of magnesia, sulphate of zinc, and citric acid are modified examples. The oblique prismatic well shown in sulphate of soda, binoxalate of potash, and tartaric acid; and, lastly, the doubly oblique prismatic, which will be easily remembered from its containing, among others, sulphate of copper and quadroxalate of potash.

The first point of importance in the production of well-formed crystals, is to ascertain the most suitable degree of saturation of the solution.

The proportions usually quoted in books, although frequently approximative, are not generally the best. Moreover, these proportions must of necessity vary with the temperature. As a general rule, a completely saturated solution is not the most eligible, for, upon the slightest reduction of temperature, a considerable quantity of small crystals are deposited, while from a solution somewhat more dilute, fewer, larger, isolated, and more perfectly-formed crystals are generally obtained. A little practice will soon enable us to define the most suitable conditions in this respect.

In cases where the substance to be crystallized has to be eliminated, as the crystallizable alkaloids, vegetable acids, &c., the density or specific gravity becomes the only test by which to ascertain the proper degree of concentration. But here, again, we do not always succeed; for, although we may have found that very fine crystals were obtained on an occasion when the solution had an ascertained density, yet, unless the apartment into which it was set aside shall always have pretty nearly the same temperature, the crystals will not be satisfactorily produced.

So that, having ascertained, in the one case, the best proportion of a saline substance for solution in water, supposing that to be the menstruum, and the most suitable density in the other, care must be taken that the place where both are set aside, shall have a temperature subject only to a trifling variation. Underground places answer very well, in many instances; but in others, it is better that the temperature be a little higher, since it is found that if they be crystallized at a temperature lower than the average, they are apt, at a higher one, to give up a portion of their water, to become fluid, or to crack.

These conditions being determined, and a number of crystals obtained, we have now to consider the best mode of insuring their subsequent symmetrical growth. This may be effected in three ways, either by adding, at stated intervals, additional quantities of the salt dissolved in a small quantity of the solution itself; by adding to the solution a fluid capable of uniting with the menstruum, but in which the salt is insoluble; or, by an appropriate evaporation, *i. e.*, by reducing the solution a given weight, and returning the crystals when it has sufficiently cooled, or by a continuously spontaneous evaporation, in a warm atmosphere, as in the cases of protonitrate (nitrate of the sub-oxide) of mercury, and sulphate of manganese.

Next in importance are the arrangements which affect the position of the crystals. For prisms (right or oblique) a flat-bottomed, smooth, shallow dish will be found the most suitable; for octahedrons a cylindrical vessel, into which is suspended a piece of horse-hair or gut (to be had at the fishing-tackle warehouses, and known in the trade as "silk-worm gut.")

Matters being thus arranged, the solution is set aside for (say) twenty-four hours. It is then removed from the vessel, and from the gut, in the one case, are removed all the octahedra, excepting those more perfectly formed, together with the whole of those which may have attached themselves to the bottom of the vessel.

The prisms in the other case, which form upon the flat bottom of the vessel, are in like manner examined—the more perfect selected, the remainder removed. The respective liquors are then returned; at the bottom of the one are arranged the prisms, while in the other the gut is resuspended.

After another interval they are again similarly examined, small imperfect crystals removed, which, from the beginning, are to be preserved, the position of the prisms reversed, and both—returned to their respective liquors—again set aside.

This removal of the small crystals is repeated daily, so long as any continue to be deposited, since, by their growth, they would weaken the solution.

When the prisms and octahedrons have ceased to increase, and none, or scarcely any are deposited at the bottom, &c., the liquor may be removed to a cooler place—the lower part of the building for instance—which, in consequence of the temperature being more constant, is, perhaps, on the whole, the most suitable for the subsequent growth of the crystals.

When the liquor is at length so far reduced in strength that no further depositions are made, and no perceptible increase in the elected crystals is observable, the accumulated small crystals are redissolved by small quantities at a time, and added to the mother-liquor as before explained. These being exhausted, the crystals may be increased at pleasure, by preparing from a highly concentrated solution a quantity of the same compound, to be added gradually as before.

It remains to be added that in consequence of the liquor becoming denser in the lower than in the upper strata, and their consequent more rapid growth in the former, it is necessary, not only to regulate the strength of the solution, in the manner referred to, but to reverse the position of the crystals themselves almost daily.

The gut, therefore, which has hitherto pierced the octahedra, must be cut off as closely as possible, and attached externally by a noose, which will facilitate its removal and attachment.

It ought also to be added, that when a crystal is suspended, it should be so arranged that two of the opposite planes may be placed horizontally, and that it is found expedient, for the purpose of perfecting the termini of the larger prisms, that they should be suspended vertically.

Several crystals were exhibited by Mr. Copney, which he had grown in the manner described in his paper. Among them were some perfect octahedra of chrome alum and common alum, of great size and beauty. The octahedron of chrome alum weighed 7¾ ounces, and the edges of the crystal were 2½ inches in length. The octahedron of common alum weighed 6½ ounces, and the edges were 2⅜-inches in length. There was also a beautiful crystal, the nucleus of which was of common white alum, over which were depositions of a mixture of common alum and chrome alum, in such proportions as to give the crystal a beautiful pink, or slightly amethystine colour. Still larger than these, however, was one of chrome alum, containing a little common alum, the weight of which was nine ounces, and the length of the edges 2⅜-inches.

Besides these crystals, there were some of unusually large size, of sulphate of magnesia, and of citric acid.

The whole of these crystals excited much admiration, and the author of the paper, a late pupil in the Society's school, was complimented for the skill he had manifested in producing such beautiful preparations from the small quantities of ingredients he had to operate upon. It was mentioned that the crystals of citric acid, which weighed nearly an ounce, were obtained from a pint and a half of lemon juice.

GLACIAL ACETIC ACID.

Mr. Redwood laid before the meeting a specimen of *glacial acetic acid* prepared by the process given in the new Dublin Pharmacopœia. He stated that he was anxious to offer a few observations on this process with the view of modifying an opinion he had expressed on a former occasion (see Pharmaceutical Journal for February last, p. 390). He had not then tried the process, but had concluded that the product would be liable to be contaminated with hydrochloric acid. The process had since been tried in the laboratory, one of the students, Mr. Groves, having made some experiments with the view of ascertaining whether the process, when strictly followed, would yield pure acetic acid, and the result had tended to modify considerably the opinion which he (Mr. R.) had previously entertained. With a few trifling modifications, the process fulfilled all that was desired, and he had no hesitation in saying that it was better than any other that had been published. As a proof of this, the specimen of glacial acetic acid on the table was obtained by one distillation, as directed in the Dublin Pharmacopœia, without any subsequent purification, and it was one of the best and purest specimens he had seen. The modifications which Mr. Groves had suggested and had found to be improvements, consisted in the use of a large U shaped tube, instead of a retort or flask, for decomposing the acetate of lead with hydrochloric acid gas, and the introduction of broken pieces of pumice-stone mixed with the acetate to prevent the latter from running into a mass and obstructing the passage of the gas as the decomposition proceeded. The quantity of hydrochloric acid gas generated, according to the instructions of the Pharmacopœia, was insufficient for the complete decomposition of the acetate of lead, so that none of this gas was left free to pass over with the distilled product in the latter part of the process.

BILL FOR REGULATING THE SALE OF ARSENIC.

A copy of the Bill before Parliament for regulating the sale of arsenic was read, with the view of ascertaining the opinions of the Members present as to its probable effects. A favourable opinion was generally expressed with reference to it.

The President, in adjourning the meeting, stated that that terminated the evening meetings for the season. He thanked the Members and Visitors for their attendance, and for the interest they had manifested in the proceedings. It would afford him much gratification on retiring from office, to feel that the meetings had never been better attended and supported than during the period of his Presidency.

ORIGINAL AND EXTRACTED ARTICLES.

ON SOME PREPARATIONS IN THE NEW LONDON PHARMACOPŒIA.

BY MR. WILLIAM BASTICK.

To many the perusal of the new edition of the Pharmacopœia will produce a feeling of disappointment, in consequence of the absence of any great novelties and changes, such as are usually looked for and presented. The College of Physicians are not responsible for this uninteresting condition of their new Pharmacopœia; for, with the exception of cod-liver oil and chloroform, Pharmacy during the last fourteen years has not produced any of those remarkable and potent therapeutic agents which have a strong and oftentimes an undeniable claim to be introduced therein. In the edition of 1836 hydrocyanic acid, creosote, quinine, and other alkaloids were for the first time to be inserted; hence the great interest and curiosity that were attached to its appearance.

Nevertheless there are in the new edition of the London Pharmacopœia some alterations, additions, and omissions, which, although not of great importance, it may not be devoid of interest to make a few remarks upon.

In making these comments I shall not follow any precise order; but take the subjects of them as they recur to the memory.

Tinctura quinæ composita is one of the novelties of the new Pharmacopœia; the formula for its preparation is so absurd and contradictory as to induce the belief that the authorities must have devised it without any probationary trials. The quantity of disulphate of quinine ordered for each drachm of tincture of orange-peel is one grain, which is doubtless the quantity the College authorities wished to be dissolved therein; but they forgot to inquire respecting the degree of solubility of this salt in proof spirit, or they would have discovered that it is utterly impossible to dissolve one moiety of a grain in the above quantity of the tincture. This evil might have been remedied by converting the disulphate into the sulphate of quinine, a salt which is much more readily soluble in alcohol and in water than the former. But even this alteration in the formula would not have rendered it an eligible and economical mode of administering quinine, in consequence of the tannin of the orange-peel precipitating a considerable portion of the quinine which would be wasted by filtering the tincture.

But what is more extraordinary, the College does not seem confident of the correctness and completeness of its formula, for it directs the disulphate of quinine to be digested in the tincture for seven days, or until it is dissolved, and then to be filtered. In reference to these directions, it must be evident that the salt of quinine will dissolve in seven hours, or more probably seven minutes, or not at all; and that if it dissolves, it is not necessary to filter the tincture. It may be also observed, without being deemed hypercritical, that the College have given the same superfluous directions with the formula for tinctura iodinii co., for it is manifest, that if the iodine and the iodide of potassium be pure, as the Pharmacopœia directs they should be, they will dissolve perfectly in the rectified spirits, consequently the filtration is unnecessary. Whilst on the subject of tinctures, it may not be irrelevant to inquire what is the pretence or justification for having two different formulæ for tincture of lobelia, when it is an ascertained fact that both alcohol and ether are proper and efficient solvents of the active principle of lobelia inflata.

Iodide of iron has been displaced in the new Pharmacopœia by a good formula for syrupus ferri iodidi, which seems to answer every purpose for which this salt can be administered. This syrup contains four grains of iodine in the drachm, or five and a half grains of iodide of iron, when prepared according to this formula, therefore is somewhat stronger than that usually found in commerce.

The formula for preparing ferri carbonas cum saccharo is open to considerable objection, because sufficient precautions are not recommended to be attended to to ensure this compound from being partially peroxidized. In the first place, the formula should direct, which it does not, that the hot solutions of the salts of soda and iron should be mixed in a closed vessel, and allowed to remain therein for the carbonate of iron to subside. Secondly, it should advise that the precipitate should be well washed with distilled water, which has been recently boiled; for if this expedient be not adopted, the free oxygen in the water will peroxidize a fresh portion of the iron in every successive washing.

The College have wisely discarded the formula for ferri potassio-tartras contained in the edition of 1836, from the present Pharmacopœia, and supplied one, which, although still liable to criticism, is more worthy of the advanced stage of Pharmaceutical Chemistry than the former. The imperfections of this formula are twofold, the quantity of sulphate of iron ordered to be employed is in unnecessary excess in proportion to the bitartrate of potash, for, as I have previously shown in the Pharmaceutical Journal*, the proportions should be three parts of sulphate of iron to nearly two parts of bitartrate of potash, whereas the College has directed to be used, four parts to two. If the waste of the iron salt were the only objection to these proportions, it would be scarcely worth notice, but there is a more serious one to the employment of an excess of iron peroxide, viz., that in subjecting to continued heat the solution of bitartrate of potash, to ascertain that it will not dissolve more peroxide of iron, the potassio-tartrate of iron formed therein is rendered liable to decomposition. Furthermore, the Pharmacopœia directs that the peroxide should be added by degrees to the solution of cream of tartar, instead of a sufficient and known quantity at once to saturate it, which, in a much greater degree, endangers the formation of a perfect salt than the objection above cited.

In the note to this formula, the object of which is to point out how to test the result obtained by it, are the following words: "Quod si cum potassâ calefactus fuerit, e granis 100 demittit ferri sesquioxidi grana circiter 34." I will remark in reference to this criterion of the quality of the above salt, with due deference to the authorities that devised it, that it is utterly impossible to introduce about 34 per cent. of peroxide of iron into this salt, consequently it is equally impossible to precipitate about that quantity by potash from it. The real quantity found in it will be about 30 per cent.

One of the most novel features of the new edition of the Pharmacopœia is the introduction of formulæ for what are termed inspissated infusions of bark, in imitation of Mr. Battley's liquor cinchonæ. The College must have acquired a magic influence over Mr. Battley to have induced him at last to have confided to the authors of the Pharmacopœia his valuable and mysteriously secret process for preparing these liquors. The only regret connected with this revelation, is, that he did not extend it to his liquor opii sedativus, or if he has done so, that the College has not conferred so precious a boon on the Pharmaceutist of this country, by publishing the formula for its preparation, as from its extensive use and its high price, there is a strong temptation to substitute cheap, though perhaps, equally efficient imitations of it. The profession have pronounced it to be a valuable preparation, therefore it does not become a pharmaceutist to doubt openly the wisdom of its decision; but nevertheless, I cannot refrain from expressing the opinion that the introduction of a formula for liquor opii sedativus, would be a retrograde movement in pharmacy and medicine, when there are so many certain and elegant compounds of morphia at command. The same observation applies with equal force to the new formulæ for inspissated infusions of bark, for here the science of Pharmacy has placed at the disposal of medicine the salts of quinine in great efficiency and variety.

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* Vol. x., page 441.

These formulæ have been constructed upon the assumption first promulgated and adopted by Mr. Battley, that specific gravity is a truer criterion of uniformity of strength as regards an infusion, than that of obtaining a certain quantity of fluid from a given weight of the substance infused, hence the College have directed that their infusions shall be of the specific gravity, 1.200. I believe this assumption to be a fallacious one, and only partly true as regards the physical characteristics of an infusion, but totally false with reference to its chemical constitution, which is the most important point to be considered in such preparations.

If the specific gravity test were a true one, it ought to be and could be applied to nearly all the fluid preparations of the Pharmacopœia, and especially to tinctures, of which it is certainly at least of as much importance that they should be of uniform strength as inspissated infusions.

It appears that the College compilers of the Pharmacopœia have no standard to guide them as to what articles of the Materia Medica, or what preparations are to be admitted in or rejected from the Pharmacopœia; in fact it seems, to a great extent, to be a matter of caprice, or at least the medical mind at large does not seem to be consulted on the subject. Were it otherwise it would be difficult to account for the omission of such remedial agents as oxide of silver, citrate of iron and quinine, &c., and for admission of such as tinctura limonum, liquor arsenici chloridi, liquor ammoniæ citratis, &c.

There is one reason in particular why such a compound as citrate of iron and quinine should be introduced when its use has become so extensive, which is unquestionably the case with this salt. This reason is that by the College giving a formula for its preparation, the best measure has been adopted to ensure an uniform compound. At present every manufacturer makes such a mixture of citrate of iron and citrate of quinine as he conceives best either for his own purpose or that of the prescriber. These remarks do not apply to oxide of silver, which ought to have had a place in the Pharmacopœia from its general employment by the profession, because oxide of silver can mean nothing but a compound of one atom of oxygen and one atom of silver, and also because the method of its preparation is a matter of indifference so long as a pure result is obtained.

The College seems, in the new edition of the Pharmacopicea, to have recognized this rule of guidance, although not so fully as could have been desired.

Upon the whole the new edition of the Pharmacopœia is undoubtedly an improvement on the last. For, although there is nothing to dazzle the imagination in the shape of alteration or improvement, there are several new and valuable features in it which unfetter the Pharmaceutist, and have a tendency to promote Pharmaceutical progress; as for example, placing nearly all the chemical compounds, when the names of such compounds import their constitution, in the list of Materia Medica, and giving only directions to test their purity and strength. In this latter respect it is only to be regretted that the information conveyed is not more full and explicit.

Doubtless, the Pharmacopœia will bear greater evidence of care and skill in its compilation when the College shall not consider it *infra dignitate* to call to its councils the experience and practical science of the professed Pharmaceutist, whose daily observation and undivided attention gives him many advantages over the theorist, however gifted. Till that time arrives Pharmacy will ever be in advance of the Pharmacopœia.

ON THE BOTANICAL ORIGIN OF SENNA LEAVES.

BY PROF. G. BISCHOFF.

The opinions of Batka on the origin of senna (Pharmaceutical Journal, vol. ix., p. 25) are declared by Bischoff to be founded in error. Batka states that the *senna from Alexandria* consists of a mixture of the leaves of three species of cassia, namely, *C. angustifolia*, Vahl., *C. acutifolia*, Del., and *C. obovata*, Collad., with the leaves of *Cynanchum Arghel*. But Bischoff, in his repeated examinations, found only leaves, leafstalks, and fragments of the pods of two species, viz., *C. acutifolia* and *C. obovata*, with the leaves of Arghel. He further states the reasons why he considers Batka's opinions to be erroneous, and shows, that *C. angustifolia*, which, according to Batka, also yields Mecca and East India senna leaves, is not identical with the *C. lanceolata*, Forskal.

The identity of *C. lanceolata*, Forsk. with *C. ligustrina*, is also disproved, as well as the statement of Batka, that Nees has represented small glands on the *Cassia lanceolata*, Nect., in the collection at Dusseldorf, or rather, that he has represented as such, two hairy stipules "at the bases of the two sides of the petiole," for Nees expressly says, in the diagnosis of this species, "petiolis eglandulosis."

That the *C. lanceolata*, Nect., is the same as *C. acutifolia*, Delile, is quite correct. Nees was, therefore, perfectly right, when he added to the latter species (represented on Tab. 345 of the Dusseldorf collection) the *C. Senna var. a. Linn.* as synonymous, because it does actually belong to it; but he was wrong in mistaking another species (Tab. 346) found by Ehrenberg and Hemperich in Arabia Felix, for *C. acutifolia*, Del., from which it is to be distinguished. It belongs to another species, which Bischoff calls *C. medicinalis*. There are, however, different varieties of it met with; two indigenous to Arabia Felix, are the mother-plants of the common and narrow senna of Mecca, whilst the third, which is cultivated in the East Indies, furnishes the various sorts of East India senna.

The identity of *C. Senna*, L., with *C. obovata*, Collad., is also denied by the author, the latter species corresponding only with the *var.* β Linn. Equally incorrect is the observation, that "all more full grown leaves of *C. obovata*, Collad., are at the top blunt (*obtusata*) and retuse (*retusa*), and the younger ones more ovate (*subovata, obovata*). The same is the case with the assertion, that "the dark-green pods, which, together with the leaves of *C. obovata*, are found in various sorts of commercial senna, but are frequently met with as a separate sort of the so-called *Folliculi sennæ* have, when "ripe, a reniform contracted shape, and when unripe, a more bottle-gourd rounded form," for not only the unripe fruits, but also the ripe ones, are not unfrequently more or less deformed one-seeded or few-seeded, and contracted between the seeds, but at the same time they are always flattened or compressed laterally, and cannot, therefore, be compared to a bottle gourd. These fruits, moreover, are not dark-green, but of a brownish-grey colour, and brownish-red in the middle; they are, moreover, recognised by the longitudinal row of small rounded lobules, which occupy the central line of both flat sides,

The plant from which the small felty leaflets come, which are sometimes found in the senna from Mecca, has been considered by Batka as a new species, which he calls *C. tomentosa*. But this denomination has already been given to another Linnæan species, and the plant itself is merely *C. Schimperi* Steudal. The author has seen specimens of it from Arabia Felix, and from the northern coasts of Abyssinia.

In the senna of Tripoli the author has found no other leaves but those of *C. acutifolia*, Nect., and only small proportions of the leaves of *C. obovata*, Collad.; the presence of a third sort of leaves, *Senna angustifolia*, has never been noticed by any one except by Batka; and an admixture of these leaves is not probable, since the *Cassia* mentioned by him as *Senna angustifolia*, does not grow in those countries from whence *Tripoli senna* is imported (viz., Nubia, Cordofan, and Sennaar), but in Arabia Felix. The admixture of leaves, and still more so of the fruits of *Tephrosia Appolinea* De C., in this sort of senna, has been frequently noticed before by many druggists.

Senna angustifolia is also, according to Batka, the mother-plant of the senna-leaves of Tinnevelley, but there are only a subvariety of the East India senna, and according to the author, a variety of his *C. medicinalis*. This variety has probably been cultivated from seeds imported from Arabia into the East Indies, either in the usual way with the senna-leaves from Mecca, or directly by Hindu merchants.

The division of the Genus *Cassia* proposed by Batka, is considered by the author to be inadvisable, and the generic characters to be incorrect. He prefers to adhere for the present to the division introduced by De Candolle (*Prodrom.*), or to that proposed by Ph. Vogel in groups and subordinate groups.

The author goes on to speak more exclusively of those species of Cassia which yield senna-leaves, and gives a minute description of them (*Bot. Zeitung*, 1850).

CASSIA OBOVATA, Colladon. Leaves 4-7-paired pinnate; petiole without glands; leaflets obovate and oblong-obovate, mucronate, on the underside or on both sides downy from appressed hairs; stipules persistent; racemes axillary, generally longer than the supporting leaf; pods oblong, sickle-shaped, curved, furnished on both sides with a longitudinal row of lobular appendages. *Synon. Cassia Senna β* Linn. *Spec. plant.* p. 539. *C. Senna* Pers. *Synops.* i. p. 457. *C. obovata*, Collad. *Hist. d. Casses* p. 92. tab. 15, fig. A. Bisch. *in Bot. Zeitung*, 1850. (*Cum icon foliolorum, fruct. et semin.*). *Senna obovata*, Batka.

To this species belong the following varieties:

a. genuina: leaflets at the point either rounded and blunt, or more rarely with a short point: the racemes longer than the supporting leaf; pods moderately sickle-shaped. *Synon. Cassia Senna* (*Séné de la Thebaïde*) Nectoux *Voy. dans la haute, Eg.* p. 19, tab. 1 *C. obovata*, Collad. *Hist. des Casses*, p. 92, as regards the diagnosis (after Hayne). De Cand. *Prodr. syst. nat.* ii. p. 492. Hayne *Arzneigew*, ix. tab. 42. *C. obovata a. genuina* Bisch. *Med. Pharm. Bot.* p. 14.

β. obtusata: the pinnules at the point truncated blunt, or slightly retuse; the racemes longer than the supporting leaf; the pods moderately sickle-shaped. *Synon. Cassia Senna* Jacq. *Eclog. Pl. Rar. n.* 87, tab. 87. Lam. *illustr.* tab. 332, fig. 2, *a. b. d.*, *C. obovata* Collad. *Hist. d. Casses* tab. 15, fig A. (excluding the diagnosis and several synonyms (after Hayne). *C. obtusata* Hayne, *Arzneigew*, ix. tab. 43. *C. obtusa*, Roxb. (after Wight et Arnott, *Prodr. Flor. Penins. Ind. Orient.* i. p. 288, and *Wight Herbar.* n. 655). *C. obovata b obtusata* Bisch. *Med. Pharm. Bot.* p. 14.

γ. platycarpa: the pinnules rounded, blunt or retuse; the racemes as long or shorter than the supporting leaf; the pods broader than in var *a* and *β*, slightly curved, with slightly projecting appendages at the sides.

Of these varieties the chief form, *a*, and the variety, *β*, are found in Arabia Felix and Petræa, in Upper Egypt (near Syene), in Nubia, Dongola, Sennaar, Cordofan, and Abyssinia, and is cultivated in gardens in Abu-Zabel, near Cairo, and in the West Indies. The variety, *γ*, grows in Senegambia. The flowering season is from October to January. The plant is probably annual. The leaflets of *a* and *β* with the stalks and fragments of pods are seldom met with in commerce alone as Aleppo senna. They generally form a large proportion of the senna of Alexandria, a smaller one of senna of Tripolis, and are rarely mixed with the senna of Mecca. The leaves of the variety, *γ*, have been imported into France as senna from Senegal.

Cassia Schimperi, Steudel.—Leaves 6-9-paired, pinnate; petioles without glands; leaflets oval, ovate-oblong, rounded blunt or retuse, very shortly mucronate, covered on both sides with erect hairs, shortly felted and ciliated: stipules persistent; racemes axillary, shorter than the supporting leaf; pods oblong, sickle-shaped, curved almost uniform, felted with short hairs and ciliated with thick short hairs, on both sides without appendages. *Synon. Cassia pubescens*, Rob. Brown (in App. to Salt. *Voy. to Abyssin.*), nec Jacq., nec Ruiz, et Pav. (Compare Theod. Vogel *in Linnæa*, xv., p. 71.) *C. cana*, Wender (*in Linnæa*, xii., p. 22), nec Nees, nec Schrank. *C. obtusata*, Steud. et Hochstett (in W. Schimp., *Plant Exsicc. Arab. Folic.*, n. 780) non Hayne. *C. Schimperi*, Steud., *Herb. et Nomencl. Bot.* (1840), Bisch. in *Bot. Zeit.*, 1850 (*cum icon. foliol. fruct. et semin.*) *Senna tomentosa*, Batka. This variety grows in Arabia Felix, and on the coasts of Abyssinia.

Cassia Lenitiva.—Leaves 4—6-paired, pinnate; petiole without glands; leaflets ovate, ovate-oblong or ovate-lanceolate, mucronate, pubescent on both sides; stipules persistent; racemes axillary, longer than the supporting leaf; pods oval or oblong, obliquely truncated, scarcely curved as a sickle, on both sides without appendages.

Synon. *Cassia senna*, *a.* Linn., *Spec. Plant*, p. 539. *C. orientalis*, Pers., *Synops*, i., p. 457 (*exclus. synon.* Forsk., *et glandula petiolorum*). *C. lenitiva*, Bisch. (in bot. Zeit., 1850, cum icon. foliol. fruct. et semin). *Senna acutifolia*, Batka.

With regard to the pinnules, the following varieties of this species may be distinguished.

a. obtusifolia; pinnules oval or almost ovate, blunt, or more rarely rounded at the point, with a mucro. Synon. *Cassia lanceolata*, Nectoux, *Voy. dans la haute Eg.*, p. 19, tab. 2. Hayne, *Arzneigew*, ix., tab. 41. Fr. Nees in the Dusseldorf collection, tab. 345. Theod. Vogel, *Synops. gen. Cass.*, p. 36. Bisch, *Med. Pharm. Bot.*, p. 13. Collad., *Hist. d. Casses*, p. 93, *excl. synon.* Del. (after Vogel). *C. ovata* Mérat et De Lens (after Dierbach in Geig. *Handb. d. Pharm.*, ii. 1127).

β. acutifolia: pinnules ovate-oblong or ovate lanceolate, acute, and gradually terminating in the mucro. Synon. *Cassia acutifolia*, Delile, *Mém. sur l'Eg.* iii., p. 316; *Flor d'Eg.*, p. 219, tab. 27, fig. 1 (exclus. synon. Nect). Hayne, *Arzneigew*, ix., tab. 40 (exclus. synon. Forsk). Theod. Vogel, *Synops. Gen. Cass.* p. 36 (exclus. omnib. synon. except. Haynei). *C. lanceolata*, Collad., *Hist. de. Casses*, p. 93, *ex parte* De Cand., *Prodr.* ii., p. 492 non Forsk).

Both varieties appear mostly to grow together in Upper Egypt, in the valleys of the desert to the south and east of Syene, and farther southward in Nubia and Cordofan. The pennules, partly mixed with stalks and fragments of pods, constitute by themselves, or with a few leaves of *C. obovata*, the senna of Tripoli. They are also contained in large proportion, among the Alexandrian senna leaves, and in small quantities among those from Mecca. The pods by themselves are sold as a second sort of senna pods.

Cassia Medicinalis.—Leaves 5—9-paired, pinnate; petioles without glands; leaflets lanceolate, acute or acuminate, pubescent on the under surface from appressed hairs; stipules persistent; racemes axillary, about as long as the supporting leaf; pods elongated, oblong, slightly curved as a sickle, on both sides without appendages.

Synon. *C. medicinalis*, Bisch in *Bot. Zeit.*, 1850) cum icon. foliol. fruct. et semin). *Senna angustifolia*, Batka (exelus. synon. Vahl).

This species contains three varieties:—

a. genuina; the pinnules 5—7-paired, shorter, somewhat acute, ovate, mostly thick (as in the following variety) and in the dry state somewhat coriaceous. Synon. *Cassia lanceolata*, auctor. plur. (non Forsk). *C. medica* Forsk., *Flor. Veg. Arab.*, p. cxi ?

β *Royleana* ; pinnules 5—7-paired, larger, mostly more acute, thinner, and more membranous. A variety by cultivation. Synon. *Cassia lanceolata*, Royle, *Illust. of Bot. of the Himal. Mount*, p. 186 and 201, tab. 37. Wight, *Herbar. Propr.* N. 654!'(non Forsk). *C. elongata*, Lemaire Lisancourt (after Royle, l. c.)

γ *Ehrenbergii* ; pinnules, 7—9 paired, elongated, or linear-lanceolate, acuminate ; pods longer than in the preceding form. The whole plant is more robust, and appears to have grown in a better soil. Synon. *Cassia lanceolata*, Ehrenb. et Hemperich, herbar. (non. Forsk). *C. acutifolia*, Fr. Nees, in the Dusseldorf collection, tab. 346 (non Delile). *C. Ehrenbergii*, Bisch., in *Bot. Zeit.*, 1844, column 51, and *Med. Pharm. Bot.*, p. 778.

The principal form, *α*, grows in Arabia Felix ; the variety, *β*, in the north-western part of the East Indies, in the districts of Agra and Muttra, and is also cultivated on a large scale in the most southern part of the Indian peninsula, about Tinnevelly, near Palamcottah; the variety *γ*, is found in the district of Tehama, in Arabia. The chief form, *α*, yields the genuine Mecca senna leaves; the variety, *β*, the common East Indian and Tinnevelly senna, and the narrower leaves of the variety *γ*, which are frequently mixed up with the narrow-leaved Mecca senna of the chief form, *α*, are sold, but seldom by themselves, as narrow-leaved senna from Aleppo. Also the pods of *C. medicinalis* have recently come into commerce as a third sort of senna pods.

The CASSIA LANCEOLATA, Forsk., belongs to another group, *Chamaesenna*, De Cand.; it yields scarcely any saleable leaves, nor any of those sorts which have been taken by many authors for *C. lanceolata*, and is identical with the synonymous plant of Forskal, which grows in Arabia Felix.—*Central Blatt*, 1851, No. viii., p. 123.

ON GUTTA PERCHA, CAOUTCHOUC, AND THE MILKY JUICE OF FICUS ELASTICA.

BY DR. A. ADRIANI.

THE tree which yields the gutta percha, has repeatedly been described by the name of *Isonandra Gutta* (*see* Pharmaceutical Journal, vol. vii., p. 179) specimens of which are to be seen in the Botanical Garden at Kew. The manner in which gutta percha is obtained, is likely to exterminate entirely this plant in the course of time. The trees, which reach a height of from forty to sixty feet, and a diameter of three to six feet, are cut down close to the root, the bark peeled off, and the milky juice collected in pieces of bamboo-cane, cocoa-nut shells, &c. The milky juice is then inspissated by boiling, or, according to other reports, dried by exposure to the air. At an average, ten trees are required to obtain one picul = 61.513 kilogrammes of gutta ; 69,180 trees were therefore required to collect the 6,918 piculs, which, during the three years of 1845 to 1847, were exported from Sincapore alone.

The caoutchouc is gathered with greater care; Edwards reports that two gallons of the caoutchouc milky juice were collected from 120 trees, and this could be repeated during many months. The milky juice of *Isonandra Gutta* appears never to have been imported to Europe until now. The chief trade in gutta percha is at Sincapore. It is carried on by the Chinese, who adulterate it with a valueless juice of a tree, called *Getah Malabeōya*, which they import from Palembang. By this admixture, various sorts of gutta percha are obtained, which differ considerably in price.

Examination of the Milky Juice of Ficus elastica.—The author had the opportunity to examine the fresh milky juice of *F. elastica* (from which, as from other species of *Ficus*, caoutchouc is manufactured in the East Indies) from a plant of two-and-a-quarter metres high, which, even after extracting part of the juice, remains in a good condition in the botanical gardens of Utrecht. The milky juice was obtained by cutting off branches or leafstalks, and successively introducing the cut ends into small vessels, and allowing the juice to flow out. The author then found, that the nearer the part from which the milky juice was drawn was to the upper end of the plant, the larger was its proportion of water. That drawn from a terminal bud, contained 17.7 per cent. solid substance; that which issued closely beneath the latter, contained 20.98; and that drawn from a leafstalk thirty centimetres above the ground, 25.15. Corresponding with this proportion, the milky juice from the upper parts appears to be less milky and more aqueous than that from the inferior parts. The fresh milky juice has an acid reaction, and under the microscope appears to consist of a clear, aqueous, fluid, in which float a large number of globules of small diameter, and consisting of caoutchouc. By mixing the juice with water, no change takes place; on the addition of alcohol, a large number of small crystalline needles are precipitated, which unite in groups; ether causes the globules to unite, whilst the same needles are forming as with alcohol. Nitric acid produces a slight white precipitate, which is not redissolved by ammonia; ammonia or potash colours the liquid yellowish; tincture of iodine colours the globules brown, and causes them to combine together to form larger viscid drops. Being dried on a glass plate, the juice leaves a membraneous coating behind, in consequence of the union of the caoutchouc drops.

The author found upon a continued microscopic analysis, that the juice from the terminal buds consists of

Water	82.30
Caoutchouc	9.57
Resin, soluble in alcohol but not in ether	1.58
of an organic acid, and a substance (sugar?) soluble in water and alcohol but not in ether	0.36
A substance soluble in water, becoming yellow by alkalies, (dextrin?) traces of	2.18
	100.48

The organic acid, whose magnesian salt forms on the addition of alcohol and ether, crystals, does not appear to have any analogy with the known organic acid. Its most remarkable peculiarity, is, that it forms, with potash and soda, salts, which are of very difficult solubility, so that it yields with a solution of one part of carbonate of potash in 200 parts of water, a considerable precipitate. The substance, which becomes yellow by potash, could not be well determined; it is, however, neither vegetable albumen, nor any other so-called protein combination.

Properties and Composition of Caoutchouc and Gutta Percha.—The spec. gravity of lump caoutchouc was, at 20° C. = 0.9628; that of bottle caoutchouc = 0.9454. In determining these, the precaution was taken to remove the adhering water bubbles, by subjecting the caoutchouc to the action of an air-pump, which was also necessary in weighing gutta percha. The spec. weight of the latter, the author found to be = 0.999; without this precaution, it was only = 0.728. A specimen of gutta percha, mechanically purified and shaped in cakes, had a spec. weight = 0.966.

The author examined, in addition to this, various samples of gutta percha. One, denominated *a*, was in cakes of five to six inches thick, and was darker on the outside than in the interior; the second, *b*, was of a very loose structure, and was much contaminated with small stones, but agreed in colour, which was in general flesh-red, with *a*; the third, *c*, was white, slightly inclined to brown. This last piece had been removed, as an impurity, from a large block of gutta percha, but was found to be in quality perfectly equal to the best gutta, and was afterwards rolled out in the manufactory of Munnich, Becke, and Co., into sheets of the thickness of paper, for address cards of that firm. The author obtained moreover, a sample of the *Getah Malabeŏya*, imported from Palembang, and also a sample of gutta percha adulterated with the latter. The getah, which appears also to be an inspissated milky juice, is much inferior to gutta percha; it is imported in the form of plates of two or three millimetres in thickness, of a greyish colour, somewhat clammy to the touch, and brittle when dried. When cut, it is of a dirty white colour and contains many impurities. The vessel in which it was contained developed on being opened a disagreeable acid smell. Treated like gutta percha and purified by hot water it was much darker than the raw substance, and often quite black; the smell is equally offensive, and its consistency similar to that of wax or glaziers' putty. The gutta percha adulterated with the getah is of a loose structure, of a more greyish colour, and of smell different to that of genuine gutta.

The water in which gutta percha has been boiled (especially the sort *a*) assumes a brown colour, and reacts as an acid. This was also observed by Soubeiran. After inspissation this reaction disappears, and seems, consequently, to proceed from some volatile organic acid. On being evaporated a brown extract-like substance remained behind, which precipitates from the watery solution upon the addition of alcohol. Its quantity is very insignificant; in the specimen *b*, it amounted, after three times boiling in water, to 0.042 per cent. of the weight of the gutta. That the gutta becomes discoloured by being boiled in water the author did not find corroborated, on the contrary, it preserves its former colour. The specimen *b* imparts to the water neither colour nor acid reaction Also from lump caoutchouc no ponderable quantity was extracted by water.

Gutta percha, treated by water and by cold alcohol, yielded a resin, which was soluble in ether and volatile oils; the quantity amounted in the sample *b* to 3.495 per cent. The gutta percha being then repeatedly boiled with alcohol, the latter extracted, besides an additional quantity of resin, also a white fat, resembling wax, amounting to 12.035 per cent. The sample *c* yielded no perceptible quantity of resin and but a small proportion of fat. From lump caoutchouc almost nothing was extracted by cold alcohol; boiling alcohol dissolved a light yellow very viscid resin of some smell and of a bitter taste, whose proportion amounted to 4.772 per cent.

After having been treated with water and alcohol the gutta percha was further treated with hot ether, which extracted a resin much of the same smell as the gutta, and was in *a* of a dark colour, in *b* similar to dry grape-sugar; its proportion was in *b* 13.610 per cent. The sample *c* yielded no resin to ether.

Having thus been treated by water, alcohol, and ether, rectified oil of turpentine was employed, in which the gutta was after a few days dissolved into a thick somewhat brownish liquid, which in a diluted state could be filtered through paper, to remove the impurities, and was then perfectly clear. One part of gutta percha requires for its solution from four to six parts of oil of turpentine. From this solution the gutta percha was obtained, by adding alcohol until the smell of the oil of turpentine had disappeared, as a beautifully white substance, possessing all the properties which characterise the gutta percha. In the course of time, however, it assumed a darker colour, and became at last yellow like straw, at the same time an acid smell developed itself similar to that of pine-resin, which originated very likely from some quantity of the oil of turpentine having been retained, which formed, with alcohol, acetic acid.

The best means of obtaining the principal and essential parts of the gutta percha in a pure state is chloroform. The samples *a* and *b* were dissolved by it even when cold; *c* required hot chloroform. The solution is very thick and like a syrup, but can be filtered, if sufficiently diluted.

From the filtered liquid the pure gutta percha is precipitated by alcohol, then washed with alcohol, and dried at 70° to 80°. The crude substance must, however, before being dissolved in chloroform, be treated with water, alcohol, and ether. Sulphuret of carbon also dissolves gutta percha, which remains behind unaltered, when the solution is evaporated. At 70° to 80° it can be moulded with facility; at 110° degrees it has the consistency of treacle; at 130° it forms an oily liquid, which congeals again when cold, and begins to be decomposed. The *Getah Malabeöya* is also dissolved by chloroform.

By the same treatment with chloroform caoutchouc can also be easily obtained in a pure state, and it then resembles, externally, very much Arabic gum. The author tried to reduce the gutta percha and caoutchouc by ammonia into an emulsion similar to the natural milky juice, but succeeded neither by the method of Summers nor by any other method. The ammonia as well as other alkalies had no other effect upon the gutta, except that of extracting from it colouring matter. Neither the purified gutta nor the caoutchouc contain nitrogen. In the crude gutta traces of it are found, 'and these are very likely contained in the extractive-like impurities. Neither could the author discover any so-called protein combination, as casein (mentioned by Guibourt as a constituent of the crude gutta percha.) Vulcanized caoutchouc becomes brittle through the influence of the air, heat, and moisture, and Burke has, therefore, recommended sulphuret of antimony to be employed instead of sulphur for vulcanizing. Gutta percha vulcanized with sulphur likewise loses its efficacy in the course of time. Vulcanized gutta percha contains 8.35 per cent. of sulphur, and caoutchouc 11.3 per cent. of this substance. It is remarkable that caoutchouc thus prepared is no longer soluble in chloroform.

By dry distillation, gutta percha yields, at 100°, a yellow oil of a penetrating but not disagreeable smell. Between 120° and 200°, yellow, offensively smelling, oily substances are going off, which become darker in the air; at a still higher temperature the colour of the very thin distilled product is more red or reddish-brown. Fifty grammes of gutta percha distilled in the sand-bath until nothing more passed over, yielded 28.83 grammes volatile oil of 0.909 sp. gr.; fifty grammes of caoutchouc, however, distilled in the same way yielded 42.884 grammes, which contained a considerable proportion of water, in consequence of an air dry substance having been employed, and the caoutchouc being able to retain more water than the gutta percha. Keat, in New York, manufactures the distilled product of gutta percha on a large scale.

The incinerated, crude, dried gutta percha (sample *b*) contained 5.18 per cent. of inorganic substances; the pure gutta treated with chloroform 0.314 per cent.; the crude caoutchouc 0.487 per cent.; that combined with chloroform 0.333 per cent. These substances consisted in the gutta percha of lime, oxide of iron, traces of potash, magnesia, and silica. The bases were combined in the ashes with carbonic acid. The ashes of caoutchouc were similarly composed.

About the origin of *Getah Malaheöya* the author could obtain no further information. In warm water it became soft and sticky; being treated with boiling water it formed a neutral milky liquid, which was precipitated by alcohol. When boiled with alcohol it became glutinous, the alcohol extracting a white fat, resembling wax and resin; ether extracted also resin. Being dissolved in chloroform and filtered, a black colouring substance remained behind, which could not be dissolved by the usual solvents, and was burnt without leaving a residue. It appears to be nothing else but soot. The *Getah* melts at 170°, and becomes decomposed only at much higher temperature, when dark coloured oils are distilled off.—*Central Blatt.*, 1851, No. ii., p. 17.

ON THE MILKY JUICE OF THE LETTUCE AND THE POPPY.

BY AUBERGIER.

Aubergier cultivated *Lactuca sativa* and the poppy on the large scale in order to obtain lactucarium and opium. In lactucarium he found *lactucin, mannit, resin, cerin, asparamid, a brown colouring substance, oxalic acid,* and *various salts.* In the year 1844, he sent fifty kilogrammes of solid lactucarium procured by himself to the exhibition at Paris.

The poppies were cultivated in rows, and the capsules cut as soon as they were perfectly developed. The collected juice was daily dried in the sun. On examining the various samples, Aubergier obtained the following results :—

KIND OF POPPIES.	Period of Gathering	Weight of the Opium after being dried *in vacuo* at 212°F.	Loss in Water.	Morphia obtained from 25 Grains of Opium.	Quantity of Morphia calculated from 100 Parts of Opium, containing 7.60 per Cent. of Water. The Normal Quantity according to Payen.
	1844				
Opium from the white poppy	July 5,11	90.52	9.48	2.100	8.570_{15}
Ditto	" 17,20	92.53	7.67	0.380	1.520_{16}
Opium from the purple-red poppy	" 10, 13	90.61	9.39	2.640	10.690
	1845				
Opium from the white poppy	July 2	88.42	11.58	1.588	6.630
Ditto	" 28	88.55	11.45	1.329	5.530
Ditto	Aug. 13	89.02	10.98	0.777	3.270
Opium from the purple-red poppy	July 21	88.40	11.60	2.659	10.370
Ditto	" 26	87.09	12.91	2.517	10.694
Ditto	" 16	89.05	10.95	2.919	11.230
Opium from the oil-poppy (*Pavots oeillettés*)	" 29, 30	88.29	11.71	4.260	17.633
Ditto	Aug. 21	86.69	13.31	3.482	14.780

This table shows that the first crop of 1844 contained more morphia than that of 1845, and the reason is, that in the first case, round poppy heads were cultivated together with long ones, which latter contain more alkaloid. The decrease in the proportion of morphia in the three crops of the white poppies in 1845, is in consequence of the advanced ripeness, and the statement that the collection should be commenced when the green colour is beginning to change into yellow, cannot therefore be correct.

If the incision be made into the external part only of the pericarp, the seeds ripen, and oil may be manufactured from them, but if the incision be made quite through the pericarp, the ripening of the seeds is stopped. The white poppy with black seeds (*pavot a oeillette*) has so thin a pericarp, that by the incision the seeds are lost, but the opium obtained therefrom contains the largest proportion of morphia.

With regard to the cultivation of opium in France, Aubergier further observes, that the expenses incurred by the collection do not exceed the fourth part of the value of the crop, and if the seeds can be saved, their price will cover the rent and all other expenses. Six labourers gathered in 1846 at Clermont, 2,730 kilogrammes of milky juice = 682 grammes, or 22$\frac{7}{10}$ ounces of dry opium. The quality of the opium depends on the species of poppy, and in the same variety of poppy, on the more or less advanced maturity of the fruit when the opium is gathered. The climate has no influence upon the quality of the opium and on the quantity of morphia obtained from opium cultivated in France and in Algeira.—*Pharm. Central Blatt*, Dec. 1850, p. 846.

ESTIMATION OF IODINE IN ORGANIC SUBSTANCES BY MEANS OF CHLOROFORM.

BY M. RABOURDIN.

The testing of iodine by means of diluted starch, leaves nothing to be desired with respect to its sensibility; but this is not the case when it relates to the estimation of the quantity of iodine contained in organic substances. I propose the use of chloroform, not as a means of rigorously determining the quantity of iodine contained in these substances, but as affording very satisfactory approximative results. Furthermore, chloroform is equally as efficient as starch in the detection of traces of iodine, for by means of this agent, we can discover its presence in a liquid containing only one hundred thousandth part of it.

If we take ten grammes of a liquid containing one hundred thousandth of its weight of iodide of potassium, and add to this liquid two drops of nitric acid, from fifteen to twenty drops of sulphuric acid, and one gramme of chloroform, by agitation the chloroform assumes a very perceptible violet tint.

I endeavoured to avail myself of this remarkable property possessed by chloroform, of carrying off the free iodine which water may contain, and of becoming of a violet colour, to estimate as nearly as possible the iodine contained in organic substances, particularly in cod-liver oil, now so much used in medicine.

I took fifty grammes of cod-liver oil, which I mixed by agitating it in a vial with five grammes of caustic potash dissolved in fifteen grammes of distilled water, and this mixture was heated in a large iron spoon, until the whole of the organic matter was destroyed: the ash resulting from this combustion was washed with the smallest possible quantity of distilled water, for the purpose of removing all soluble portions. The liquid resulting from the washing was then filtered, and ten drops of nitric acid and the same of concentrated sulphuric acid added, care being taken to cool it; four grammes of chloroform were then poured in, and the whole quickly agitated. On allowing it to stand, the chloroform was deposited of a violet colour, and this colour was not affected by decanting and washing the chloroformic solution with water. In another case, a test liquor was prepared containing one centigramme of iodide of potassium to 100 grammes of distilled water, so that ten grammes represented one milligramme of the iodide.

To ten grammes of this solution, were added two or three drops of nitric acid, twenty drops of sulphuric acid, and four grammes of chloroform, on agitation it acquired a colour which was compared with that of the solution obtained from the cod-liver oil; usually one, two, or even three grammes more of the test liquor have to be added before the shade becomes so intense.

I tested three of the principal kinds of cod-liver oil met with in commerce.

1. A dark mahogany colour, called *brown* in commerce.

2. An amber-colour, called *light* in commerce.
3. Scarcely coloured at all, called *white* or English. in commerce.

Each kind was tested three times, and, as stated above, fifty grammes was the quantity operated on.

In order to have a colour of equal intensity to that afforded by fifty grammes of the mahogany-coloured oil, I used fourteen grammes of test-liquor, say .0014 of a gramme of iodide of potassium, and for the two other kinds of oil, 12 grammes only of the same liquor were used.

Thus these three kinds of oil contain nearly the same proportion of iodine, which is to the extent of one milligramme to fifty grammes, if they have lost none during the process of combustion.

I have also ascertained by experiment that chloroform takes up all the free iodine in an aqueous solution of this body ; 500 grammes of water were saturated with pure iodine ; the solution then filtered, and afterwards agitated three different times with fifteen grammes of chloroform. The third time the chloroform passed through almost colourless.

I will here mention a circumstance which may prove of some utility, it is that when pure chloroform is used for dissolving a small quantity of iodine, it assumes a beautiful violet colour, resembling that of the vapour of iodine ; but if the chloroform contains the smallest quantity of sulphuric ether, instead of the violet colour we have a vinous colour and even caramel red, if the ether is present in any quantity—this characteristic may serve to detect the adulteration of chloroform by ether.—*Répertoire de Pharmacie.*

ON RED PHOSPHORUS.

BY PROF. A. SCHRÖTTER.

Two years ago Schrötter showed that *red phosphorus* was not an oxide, but an allotropic modification of phosphorus, which can be effected not only under water and by the light of the sun, but also in a vacuum, and in gases which do not combine with phosphorus, and also by the degrees of heat between 215 and 250° C. Furthermore, he showed that red phosphorus is amorphous, not so fusible or distillable, nor emitting so much light, and considerably less soluble and combustible than common phosphorus. Lastly, and what is most remarkable, he also proved that it is transformed again into common crystallizable phosphorus when heated to 260° C. under exclusion of air.

Schrötter has since made the following discovery : if common phosphorus be exposed, during several days in a closed glass tube, to an uninterrupted heat, it not only changes into the red modification, but assumes even immediately a coherent form. In this latter state the amorphous phosphorus is reddish-brown, on the fractured surface iron-black, of an imperfectly metallic brilliancy, brittle, and breaks easily with a perfect conchoidal fracture ; the fragments are irregular, and have pointed corners and sharp edges. The degree of hardness lies between that of calcspar and fluorspar; the density at 17° C.=2.089, the same quoted by Böttger for common phosphorus. The streak of this mass displays the red colour of the pulverulent amorphous phosphorus. If exposed at common temperature to the influence of the atmospheric air, it remains unchanged.* If some tendency to acidulation on fusion manifests itself, it originates from the presence of common phosphorus, which cannot easily be removed.

With regard to common phosphorus, Schrötter has found that it decomposes the water at a temperature of 250° to 260° C., so that spontaneously inflammable phosphuretted hydrogen is developed.—*Buchner's Repert.*, 1851, No. 19, p. 107.

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* Physiological experiments render it probable that red phosphorus may be administered in considerable doses without any injurious effects.

ON THE PHOSPHORESCENCE OF PHOSPHORUS.

BY R. F. MARCHAND.

Berzelius first suggested the idea that the emission of light by phosphorus was merely the effect of evaporation, and the consequent molecular change of phosphorus.

Prof. Marchand has now proved the correctness of this opinion by a number of carefully performed experiments, the result of which is that phosphorus emits light in all gases and vapours with which it does not chemically combine. In some gases the temperature may be very low, and in others it must reach the boiling point of phosphorus.

The emission of light is, therefore, only a consequence of evaporation, during which very probably molecular changes take place. It differs from that which occurs when phosphorus becomes oxydized, and both kinds of luminous appearances may separately occur. The emission continues as long as the phosphorus is able to evaporate and has tension. It ceases when the phosphorus is covered with some coating, by which evaporation is impeded. The tension is excessively low at a temperature of 15° C., but the emission of light does not become imperceptible until 22° C.

In a current of hydrogen, or carbonic acid perfectly devoid of oxygen, and at a proper temperature, phosphorus continues to emit light, as long as the vapours are carried off; neither litmus nor starch with iodide of potassium betray any alteration, consequently, neither oxydation, nor formation of ozone, nor any other change of the phosphorus takes place. It merely evaporates, and retains its vitreous condition in the dark, even when the experiment has been continued for many days.

If the experiment be performed in closed vessels, the development of light ceases after a short time, but only in consequence of the developed vapours impeding evaporation. As soon as this obstacle is removed, the emission of light reappears. The same also occurs on the Torricellian vacuum.

It is well known that gases and vapours which combine with phosphorus, *e. g.* the volatile oils and the different kinds of ether prevent its evaporation. It therefore follows that phosphorus emits no light in hydrogen, which has been deprived of oxygen by potassium, if the latter was contaminated with naphtha.

In compressed air phosphorus ceases to evaporate. Dr. J. Davy has stated, that a pressure of four atmospheres is necessary for this; but, Marchand found, that at a temperature of 15° C. two atmospheres sufficed to extinguish the phosphorus in dry atmospheric air. The same is the case with hydrogen and carbonic acid, if the pressure be suddenly removed; then not only does the phosphorus itself emit light, but there arises also a luminous vapour. The light disappears, however, as soon as the space is filled with the phosphorus vapour. When phosphorus becomes luminous in atmospheric air, not only evaporation but also combustion goes on, and in consequence litmus paper is coloured red.

Substances chemically related to phosphorus, such as sulphur, selenium, arsenic, and antimony, when they are vapourised, do not evolve light. But if the experiment be done in atmospheric air, these substances also possess the capacity of modifying the oxygen and changing it into ozone.—Buchner's *Repertorium*, Bd. vi. Heft. 3, p. 354.

ON THE ACTION OF MERCURIAL OINTMENT AND THE VAPOUR OF MERCURY.

BY F. VON BÆRENSPRUNG, M.D.

I. NOTWITHSTANDING the daily employment of mercurial frictions, the question of the manner in which the action takes place, has but seldom been taken up. The metallic mercury contained in the blue ointment, must necessarily penetrate the epidermis and corium, to come into contact with the blood and the internal parts of the body. Animal membranes are permeable to liquids; mercury is a liquid, hence there would scarcely be any doubt *à priori*, that this penetration is possible. It has already been shown by Béclard and Krause, that liquid mercury cannot penetrate the epidermis, even when subjected to a perpendicular pressure of twenty-six inches; but the extremely finely-divided state in which it exists in the ointment, might possibly present a favourable condition for endosmosis. Hence I first made some experiments with dead animal membranes. A pig's bladder was stretched over a vessel, and blue ointment rubbed upon it for a quarter, half, one, and even several hours; the ointment never disappeared entirely, but there remained at last a tenacious bluish-grey layer on the surface. When the friction was concluded, the under side of the bladder was examined with the microscope, and with a clean piece of gold. Globules of mercury can be readily detected under the microscope in the form of spherical corpuscles, appearing perfectly black and opake by transmitted light, but exhibiting by reflected light, a bright white and shining luminous spot. Gold is at least an equally delicate test, from its power of forming an amalgam; and a globule of mercury, which is barely perceptible to the naked eye, produces a distinct white speck upon a piece of gold. In the numerous experiments which were made, however, both methods always yielded a negative result; neither in any case could a trace of the metal be detected between the coats of the bladder on stripping them off; nor was a different result subsequently obtained, whether the friction was performed upon the porous or the mucous surface, or whether a dry or wetted bladder was used, or one impregnated with fatty matter. It was therefore repeated with the more delicate bladder of the calf and sheep; and, lastly, with the peritoneal coat of the liver of a calf, a membrane so thin that the smallest print can be read through it; but in this case, the piece of gold which had been enveloped in it did not exhibit any spot, nor did the microscope detect any globules.

But the structure of the human skin and that of animals, is different from that of the serous and mucous membranes; and it might be considered possible that the mercurial particles were rubbed into the orifices of the hair-cavities, the sebabeous and sudoriferous glands, and were thence taken up into the capillary vessels. But it is incorrect to imagine that the above organs are open canals; they are perfectly filled with cells, which exactly resemble the cells of the epidermis, moreover, direct experiments have proved this view to be untenable. When the friction was made upon a piece of human skin, or that of a cat or rabbit, mercury could never be detected on its inner surface, and microscopic examination showed that the ointment had penetrated into the external orifices of the follicles, but never further into them.

These facts undoubtedly show that metallic mercury cannot permeate dead animal membranes endosmotically. The laws of endosmose apply equally to dead and living bodies, still it appeared worth while to obtain distinct proof in regard to the latter. Half a drachm of mercurial ointment was therefore daily rubbed into the skin of a rabbit which had been carefully shaved, until the tenth day, when the animal died with the symptoms of mercurialism. The inner surface of the skin, after having been carefully separated, the blood and all the more important organs were most minutely examined, but the result was in nowise different. The same experiment was performed upon several other rabbits, dogs and a cat, all of which shortly died of mercurialism; but in no case could the least trace of metallic mercury be detected in the body.

The ingenious experiments of Autenrieth and Zeller, who first caused the skin to cicatrize over pieces of gold inserted beneath it, and then rubbed mercurial ointment upon it, and on subsequent examination found them unaltered, were long ago attended with the same result; this was however controverted by Œsterlen, who rubbed the ointment into dry membranes and the skin of living animals, and states that he always found numerous globules of mercury, not merely in and under the skin, but in almost all the organs, tissues, and secretions. With regard to this point it must be remarked, that unless the most scrupulous care be taken in cleaning the hands, the knife, the object-slide, &c., globules of mercury may be found wherever they may be looked for. If we consider, moreover, that Œsterlen also found that powdered charcoal passed by absorption from the intestine into the lacteals, we shall be justified in doubting the accuracy of these experiments, and giving the preference to my experiments.

Since it has therefore been shown that the metallic mercury in mercurial ointment does not pass into the body as such, it remains to be shown in what other manner this passage takes place.

When mercurial ointment is melted in a test-tube, the metal separates from the fat, so that the former constitutes a white layer at the bottom of the tube, whilst the latter forms a yellow supernatant liquid, and between the two there is a thin black stratum, which appears thinner when recently-prepared ointment is used, and deeper when the ointment is old. This is also seen when the metal is separated from the fatty matter by solution in ether. Hence, in addition to metallic mercury and fatty matter, the ointment contains a black substance, the quantity of which increases with its age; it is also a well-known fact that the ointment gradually gets darker by keeping. It was natural to regard this black matter as protoxide of mercury, the formation of which is favoured by the absorption of oxygen occurring whilst the fatty matter was becoming rancid. That this was the case, could be proved by the following experiment. Some freshly-prepared ointment was treated with ether; the solution poured off, the metallic residue was washed with ether, and then treated with water to which a few drops of sulphuric acid had been added. The acid, which was cold and very dilute, could not attack the metallic mercury, but would dissolve any oxide which was present. A few drops of solution of sulphuretted hydrogen were added to the filtered solution, when a brown turbidity immediately appeared, which after some hours had subsided in the form of flakes. When, instead of the fresh ointment, some which had been longer kept was used, the same reaction appeared much more strongly, and a distinct precipitate of sulphuret of mercury was formed.

In another experiment, acetic acid was substituted for the sulphuric acid. The result was the same. *It is thus proved that mercurial ointment contains protoxide of mercury in addition to metallic mercury and fatty matter**.

Donovan and Christison long since asserted this to be the case, but the younger Mitscherlich rendered it again doubtful. The two former even believed that a fifth part of the mercury was oxidized, which proportion appears far too great in accordance with my experiments; it is moreover possible, that, in addition to keeping, finer trituration might increase the amount of oxide considerably. Guibourt, on the other hand, arrived at the result that only the one five hundredth of the mercury was oxidized; that it did not exist in a free state in the ointment, but was combined with an acid. To decide this question, I tested the ætherial solution, which contained the fatty matter of the ointment, by means of a single pair of plates. A strip of sheet copper and of zinc were soldered together at one end in such a manner as to represent in form a tuning fork. When this simple apparatus is immersed in a liquid containing mercury in organic combination, in consequence of the galvanic decomposition the metal is thrown down upon the copper pole in the form of a gray film, which when rubbed upon the copper colours it white. This method has been recommended several times, and is so delicate that it detects one-tenth of a grain of corrosive sublimate in an ounce of a solution of albumen. But no mercury could be separated from the blue ointment by this means.

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* That finely-divided mercury gradually becomes partially converted into oxide is in conformity with Poggendorff's experiments, according to which the surface of a perfectly pure mass of mercury soon loses its mobility for feeble electrical actions. If the mercury be placed in contact with an acid, it reobtains its mobility, which it loses only in gases containing oxygen, not in carbonic acid and hydrogen. See *Pogg. Annal.*, lxxvii. p. 9.

We must therefore undoubtedly consider the oxide as the active ingredient of the blue ointment. But even the oxide cannot be taken into the body without the aid of a solvent; and this solvent is, in all probability, the free acid of the cutaneous secretion. Both the perspiration and the fatty secretion of the sebaceous follicles exhibit an acid reaction; and, according to Anselmino, the perspiration contains a considerable amount of free acetic acid. The acetic acid dissolves the oxide, and this solution readily transudes through animal membranes and the cells of the epidermis.

If this explanation be true, *the greater part of the mercury contained in the blue ointment is perfectly inactive*, and we ought to be able to form a far more active ointment from the pure protoxide. This can in fact be done. An ointment containing ʒj. of the black oxide of mercury to ℥ij. of fatty matter, hence as much as the blue ointment contains of metallic mercury, acts as an active poison to animals upon which it is rubbed in, and a scruple of it killed a cat in four days, and a rabbit in twenty-four hours. From some experiments which I made upon some patients with an ointment containing only one gr. of the oxide to ℥j. of fatty matter, I should consider this preparation as about equal in strength and action to the blue mercurial ointment.

The result which we have obtained in regard to the blue ointment may also be extended to a series of other preparations which are made by the trituration of metallic mercury with various substances, but are destined for internal administration. Among these are the *Æthiops per se*, the *Hyd. c. Cret.* (P. L.), the *Hyd. c. Magn.* (P. Dubl.), the *Æthiops graphiticus* (P. Sax.), *Mercurius gummosus Plenckii*, *Æthiops saccharatus*, *Æthiops tartarisatus Sellii*, *Pil. Hydrargyr.* (P. L.). As metallic mercury is no more able to penetrate the mucous membrane of the intestines than the skin, the action of these preparations can only depend upon the oxide they contain, which is formed by the trituration, and is dissolved by the free acid of the gastric and intestinal secretions. This view was confirmed by a preparation which had been made by triturating one part of mercury with two of sugar for several hours. When treated with water acidified with sulphuric acid, it yielded a solution which gave a brown turbidity with sulphuretted hydrogen. Most of these preparations have become obsolete on account of their uncertain and feeble action. Moreover, there can be no doubt that the very uncertain action of mercurial ointment does not depend merely upon the various susceptibilities of individuals, but also upon the varying quantity of oxide contained in it; and as individuality always remains an incalculable quantity x, it would be advisable, with a view to obtain the most uniform effects, to substitute for the second x a constant magnitude, and to replace the blue ointment by an ointment containing the protoxide.

II. The poisonous action of the vapour of mercury is well known. Small animals die in an atmosphere of it; and man, when constantly exposed to its influence by his calling, suffers sometimes from cough and bronchitic symptoms, sometimes from the peculiar mercurial tremors, sometimes from gingival affections, and other phænomena of mercurial cachexy. Although cases of the first kind are attributable to mere local irritation of the respiratory organs, the latter decidedly indicate absorption; hence arises the question, Can the vapour of mercury permeate animal membranes?

It is well known that a piece of gold suspended over a vessel containing mercury soon becomes white, in consequence of the evaporation of the latter. If a thin animal membrane be inserted between the two, the amalgamation ought to continue if the membrane allowed the vapours of the mercury to permeate it. A glass vessel containing mercury was tied over with a piece of peritoneum, the external surface of the latter coated with leaf-gold, and the whole placed in a warm place. In three weeks the gold had not become amalgamated, nor did it become so when the mercury was heated to ebullition, and the internal surface of the peritoneal membrane was coated with globules of mercury.

This experiment shows *that mercury does not penetrate animal membranes even in the gaseous state; hence it cannot be taken up in the living body.* Some experiments made upon rabbits render it probable that the vapour of mercury, when inspired, condenses within the organs of respiration, there becoming oxidated by intimate contact with the air and gradually absorbed.

1. A rabbit was exposed in a capacious box during an hour to the vapour of boiling mercury. When it was taken out it crawled with difficulty, and its breathing was very quick, but in the course of the day it recovered itself. The next morning it appeared to be in a very great state of uneasiness. It was again exposed to the vapour of mercury for an hour and a half. Soon afterwards it was seized with tetanic spasms, and died at the third seizure. On dissection, the mucous membrane of the trachea and bronchi was found strongly injected, and the bronchial mucous contained globules of mercury. In the lungs numerous spots of hyperæmia were found; they varied in size from that of a lentil to a pin's head; also several larger red and gray spots, between which the substance of the lung was in a state of hepatization. By the aid of a lens and the microscope, the nuclei of several of these hyperæmic and hepatized portions were seen to be formed by globules of mercury. This experiment, when repeated several times, always gave the same result.

2. A rabbit was exposed for half an hour to the vapour of mercury. In the course of the day it seemed very dull, did not eat, breathed quickly, and was in a constant tremble; on the following day it was active, and remained so until the fourth day, when it was killed. The bronchial mucous membrane was unchanged; the lungs contained numerous white spots, resembling miliary tubercles, partly surrounded by a hyperæmic line. The microscope detected in the spots granulated cells resembling pus-corpuscles, but no globules of mercury. The other organs were altered as in the preceding experiment.

3. A rabbit was enclosed in a capacious cage, in which a porcelain trough, one foot long and nine inches in breadth, full of mercury, was placed. The temperature of the room was nearly 39° Fahrenheit. During the first fourteen days no change was perceptible; it then however lost its liveliness, sat in a crouching position, and lost its appetite. It gradually became constantly duller and the respiration quicker; on the twentieth

day it dragged its hind legs along; it had a diarrhœa of blackish-brown matter, and on the twenty-second day it was dead. The blood was found loosely coagulated, the stomach and intestines were greatly distended, and the large intestine contained black liquid fæcal matter. The substance of the lung was everywhere compact, and studded with small white spots resembling miliary tubercles and isolated sugillations of the size of a lentil. No globules of mercury could be found.

These experiments prove that the vapour of mercury condenses upon the mucous membrane of the air-passages and in the air-cells of the lungs to globules, there causing inflammation and lobular hepatization; that the mercury subsequently disappears from here; and that after the long-continued action of the vapours of mercury, the phænomena of mercurialization are developed. The experiments have certainly not shown the manner in which the solution and absorption of the globules of mercury takes place. We can only assert thus much, that this cannot possibly occur without previous oxidation.

The results to which the preceding experiments have led may be summed up as follows:—

1. Metallic mercury is not capable of permeating animal membranes either in the finely-divided or gaseous state.

2. On triturating mercury with various substances, a small quantity of protoxide of mercury is formed, and this is the sole active constituent of the blue ointment and several other preparations.

3. The action of the blue ointment is uncertain, because the quantity of oxide contained in it varies according to its age and the mode of preparation.

4. Hence a more uniform and effective preparation can be made from the pure protoxide.

5. Vapours of mercury first produce inflammation of the lungs, subsequently oxidation and absorption take place, and the symptoms of mercurialism commence.—*Journ. für Prakt. Chem.*, No. ix, 1850.

HYRACEUM.

This substance is much valued by many farmers, and well known amongst them, by the rather harsh and unpoetical name of *Dasjespis*. Thunberg and other travellers mistook it for a kind of bitumen; but it is in fact the secretion of a quadruped, which is common throughout the colony, and that lives gregariously on the rocky summits of mountains, viz., the *Klipdas* or *Hyrax capensis*. It is worthy of note, that this production has baffled the researches of eminent zoologists, who have failed, from even minute dissection, in discovering any specific secretory organ from which this matter could be derived. It may be asserted, however, that the *Hyraceum* is produced by the uropoetical system of the animal just named, and in order to explain this seeming anomaly, it must be observed, that the Hyrax drinks very seldom, if ever. Its urine, like that of the *hare*, is not thin and limpid as in other quadrupeds, but thick and of a glutinous nature. From a peculiar instinct, these animals are in the habit of secreting the urine always at *one* spot, where its watery parts evaporate in the sun, while its more tenacious portions stick to the rock and harden in the air. The fresh urine of the hyrax is of a reddish tint, and this has given rise to the opinion of those who took this production for a kind of menstrual secretion.

This substance is common on our mountains, and is to be found mixed with earth and dirt near the caves or crevices where these animals have their haunts.

In smell, and in its therapeutical effects, the *Hyraceum* resembles most the *Castoreum*, a remedy which is decreasing in quantity every year, and may therefore be replaced by the former. A new article of export would thus be gained. Amongst the farmers, a solution of this substance is highly spoken of as an antispasmodic in hysterics, epilepsy, convulsions of children, St. Vitus's dance, in short, in spasmodic affections of every kind.—*Floræ Capensis Medicæ Prodromus by L. Pappe, M.D.*

[We have had the opportunity of examining the dung of the *Hyrax capensis*, now in the Zoological Gardens, and find the odour to be different from that of Hyraceum and Castoreum.—*Ed. Pharm. Journ.*]

IMPORTATION OF HYRACEUM.

This drug, an account of which was published in our number for September last, appeared in the London market (we believe for the first time) a few days since.

The quantity was about twelve pounds, contained in tins of one pound each, each tin bearing the label and circular of C. F. Juritz, Cape Town.

This hyraceum was offered at public sale on the 24th April, and was sold at 6*s.* 1*d.* per pound, it was believed for re-exportation.

ARCTOPUS ROOT (*Radix arctopi echinati.*)

Two cases, each containing about sixty pounds of the above drug, recently imported from the Cape of Good Hope, were put up to public auction on the 24th April, but met with no purchaser.

The root of *Arctopus echinatus*, Lin., nat. ord., *Umbelliferæ*, is employed in South Africa as a substitute for sarsaparilla. A sample of that recently imported consists of dry irregular pieces formed by the transverse section of the root, in diameter varying from half an inch to nearly two inches, and in thickness from three-eighths to less than one-eighth of an inch; the cut surface is of a dingy brown colour, and each piece has a zone-like mark midway between its centre and circumference. In some pieces the centre is surrounded by a well-defined dark portion. The margin or cortical part is blackish. Arctopus root has a weak bitter, somewhat acrid taste, causing a slight flow of saliva; it is almost devoid of odour. In its general appearance, it suggests the idea of small and much discoloured Calumba root.

For the further information of our readers we subjoin the account of this drug given by Dr. L. Pappe in his recent *Floræ Capensis Medicæ Prodromus*, published at Cape Town in 1850:—

"ARCTOPUS, LIN.—(UMBELLIFERÆ.)—*Arctopus echinatus*, Lin. *Root* spindle-shaped, resinous, stemless. *Radical leaves* pressed to the ground, stellate, hispid; their expanded lobes nearly round, incised, trifid; single lobes dentate, ciliated, spiny. *Flowers* diœcious, umbellate; male umbel stalked, female sessile. *Petals* white.

"This plant, the *Platdoorn* or *Ziekte-troost* of the Boers, is one of those few indigenous remedies, which, from the very establishment of the colony, have been constantly used by its inhabitants. At that early period, the European settlers, being often without their necessary stock of medicines, had to learn from their Hottentot neighbours, who held this plant in great esteem. It is demulcent and diuretic, and somewhat approaches the *sarsaparilla*. The decoction of the root, is the general form under which it is prescribed in lues, lepra, or cutaneous chronic eruptions of all kinds. It also furnishes a sort of resin, which is easily procurable by making incisions into the root while it is fresh. It has been shown from chemical experiments, that the root of this plant contains an alcaloid, which combined with acids, assumes the form of neutral salts. Thus the *Arctopium sulphuricum* consists of small scaly white crystals, which are astringent in taste, and which in half grain doses produce coagulation [?] of the saliva within the mouth."

IMPORTATION OF KOSSO.

A QUANTITY of Kosso (*Brayera anthelmintica*) has recently been imported in tins from Abyssinia. One hundred and fifty ounces of it were recently sold at public sale in Mincing Lane at 4*s.* 7*d.* per ounce.

CEDRINE, THE ACTIVE PRINCIPLE OF CEDRON SEEDS.

AT a meeting of the PARIS ACADEMY OF SCIENCES, on the 7th of April, M. Dumas announced that M. Lecoy had succeeded in separating the active principle on which the therapeutic properties of the *cedron* depends, and which he has named *cedrine.*

TERIODIDE OF ARSENIC.

GÖPEL[*] has made some experiments upon the best method of preparing iodide of arsenic, $As.I_3$. He found it to be as follows:—two drachms of iodine and one drachm of finely-powdered arsenic are mixed and maintained in fusion for some time in a digesting flask upon a sand-bath at as low a temperature as possible; the mixture when cool is treated with four ounces of cold alcohol, the solution is poured off from the residual arsenic, its colour reduced to a wine-yellow by subjection to a current of arsenietted hydrogen, and then evaporated immediately, at a temperature not exceeding 50° (122 F.) until it crystallizes. With respect to the method proposed by Meurer[†], of passing arsenietted hydrogen into an alcoholic solution of iodine, Göpel states that the former may contain free hydrogen without injury to the process, and that the treatment with the gas should be interrupted when the liquid becomes of a pale wine-yellow colour; he found that the chocolate-brown powder, deposited after too long a treatment of the liquid with arsenietted hydrogen, was composed according to the formula AsI.—*Liebig's Annual Report.*

RACEMIC ACID.

WITH reference to the formation of racemic acid, Kestner, its discoverer, has communicated the following facts[‡]. Racemic acid was prepared in Thann, in the years 1822 and 1824; at that period the bitartrate of potassa was saturated with carbonate of lime, and the decomposition was completed by chloride of calcium; the bitartrate of lime was decomposed by a large excess of sulphuric acid, the solution of tartaric acid evaporated over an open fire, and bleached by chlorine. At a subsequent period, the bitartrate of potassa was decomposed by caustic lime, only a slight excess of sulphuric acid was added, and the bleaching by chlorine discontinued; from this time racemic acid was no longer obtained.—Pelouze[§] has communicated a note of White (of Glasgow?), who in 1829 obtained, in manufacturing tartaric acid on a large scale, crystals which differed from those of tartaric acid, and which were probably racemic acid; the bitartrate he then employed was imported from Naples, Sicily, and Oporto. Kestner now mentions that the bitartrate of potassa, which he employed in 1822 and 1824, likewise came from Italy.—*Liebig's Annual Report.*

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[*] *Arch. Pharm.* [2] lx., 129.
[†] *Annual Report for* 1847 *and* 1848, i., 825.
[‡] *Compt. Rend.*, xxix, 526
[§] *Compt. Rend.*, xxix., 557.

SOLUTION OF LAC A SUBSTITUTE FOR COLLODION.

As a substitute for collodion, Dr. Mellez recommends a solution of powdered shell-lac in hot highly-rectified spirit. The solution when cold becomes gelatinous, and is used by joiners for polishing furniture. Spread on taffeta or linen and applied to the skin, it shows all the properties of collodion. It is impenetrable to air, water, fat, and the organic secretions; it does not irritate the skin, and can be employed instead of dextrin for fractures. Wounds heal remarkably quickly when dressed with this solution.—Buchner's *Repertorium*, Bd. vi., Heft 3, p. 398.

REMOVAL OF CARBONIC ACID FROM CELLARS AND OTHER PLACES WHERE IT HAS ACCUMULATED.

Aubergier proposes to remove carbonic acid from cellars and other places where, from fermentation or other causes, it has accumulated, by sprinkling about *liquor ammoniæ*; this combines with the carbonic acid to form carbonate of ammonia, and fresh air rushes in to fill up the space produced by the condensation of the acid.—*Moniteur Industriel*, 1850.

ON ATROPIA AND DATURIA.

BY DR. A VON PLANTA.

The two alkaloids, atropia and daturia, have been carefully examined by Dr. Planta, who found them to agree entirely in chemical properties with one another. Both crystallize in colourless loose needles, which are permanent in the air, inodorous, heavier than water, very easily soluble in alcohol, but less so in ether, and with greater difficulty in water. One part of atropia requires 299 parts of water at ordinary temperatures for its solution. Daturia required, according to Geizer, 288 parts of cold water and 72 of hot water.

Both alkaloids fuse at from 88° to 90° C. without losing in weight or being decomposed. At a higher temperature decomposition with partial evaporation takes place. The aqueous solution of each has a strong alkaline reaction. Both alkaloids unite with sulphuric acid and muriatic acid, and form neutral compounds, which can be evaporated to the consistency of syrup, without showing any tendency to crystallize. These salts do not only readily dissolve in water, but also in alcohol. In ether, however, they dissolve with difficulty. Ammonia and potash and their carbonates occasion only in very concentrated solutions a pulverulent precipitate, which disappears again by an excess of alkali. Bicarbonate and phosphate of soda occasion no precipitate. Chloride of gold produces a crystalline precipitate of a sulphur-yellow colour, which is but slightly soluble in muriatic acid. Chloride of platinum yields, with muriate of atropia, a pulverulent precipitate, which conglomerates like resin, and is easily dissolved by muriatic acid. The same is the case with the muriate of daturia, but only when very concentrated; the precipitate does not easily dissolve in muriatic acid. Chloride of mercury produces only in very concentrated solutions a white pulverulent precipitate, which is readily dissolved in muriatic acid and in sal ammoniac. Hydrargyro-iodide of potassium occasioned with the muriate of atropia a very solid white caseous precipitate, which strongly conglomerated on the addition of muriatic acid. Iodide of potassium had no effect. The relation of the muriate of daturia to these agents is not stated by Planta. Sulphocyanide of potassium had no effect. Tincture of iodine produced in both a kermes-brown precipitate. Tannic acid and tincture of galls produced only, upon the addition of muriatic acid, a flocculent precipitate. Nitro-picric acid occasioned a sulphur-yellow precipitate.

The analytical results both of the free alkaloids and of their compounds with chloride of gold, are:—

ATROPIA.

	Liebig.	Planta.		Equiv.
Carbon	70.03	70.58	per cent	34
Hydrogen	7.83	7.95	"	23
Nitrogen	4.83	4.84	"	1
Oxygen	17.31	16.60	"	6
	100,00	100,00		

DATURIA.

	Planta.		Equiv.
Carbon	70.58	per cent	34
Hydrogen	7.95	"	23
Nitrogen	4.84	"	1
Oxygen	16.60	"	6
	100,00		

Buchner's *Repertorium*, Bd. vi. Heft 3, p. 376.

THE RATE OF IMPORT DUTY ON DRUGS.

(Continued from page 525.)

Aloes.—The duty which previous to 1832 was 1*s.* 3*d.* per lb. on Hepatic or Barbadoes, 2s. 6*d.* on Socotrine, 3*d.* on Cape Aloes, and 9*d.* on all other sorts, was in that year fixed at 2*d.* per lb. on all sorts the produce of the British possessions, and 8*d.* per lb. from other parts. In 1842 the duty was further reduced to 1*d.* per lb. on the produce of British possessions, and 2*d.* from other parts. In 1845 the duty was repealed. We import aloes from the East Indies, Barbadoes, and the Cape; and export to America, Australia, Russia, and the ports of the Mediterranean.

Ambergris.—The duty which previous to 1832 was 2*s.* per ounce, on produce of British fishing, and 5*s.* per ounce on the produce of Foreign fishing, was then fixed at a uniform rate of 6*d.* per ounce. The duty was in 1842 further reduced to 3*d.* per ounce, and in 1845 was repealed. We obtain our supply of ambergris from the South Seas; and export to France, Italy, Spain, &c.

Angelica.—In 1826 the duty was 10*d.* per lb., subsequently reduced to 3*d.*; in 1832 it was further reduced to 4*s.* per cwt. In 1845 the duty was repealed. We import this article from Holland.

Annatto.—The duty on this article, which in 1826 was 5*d.* per lb. on flag, and 1*s.* on roll, was reduced to 2*d.* per lb. on flag, and in 1832 further reduced to 4*s.* per cwt. on the former, and 1*s.* on the latter; in 1842 it was fixed at 1*s.* per cwt. on each sort; and in 1845 was repealed. We import annatto from Spain, Brazil, and the West Indies.

Argol.—Previous to 1832 the duty on this article was 1*s.* per cwt. from British possessions, and 2*s.* from other parts; it was then reduced to the uniform rate of 6*d.* per cwt. In 1845 the duty was repealed. Naples, Oporto, and the Cape supply us with argol and tartar, which are largely employed in the manufacture of tartaric acid.

Balsam of Canada.—The duty, which had previously been 1*s.* 3*d.* per lb., was reduced to 1*d.* per lb. in 1832. In 1845 the duty was repealed.

Balsam Capivi.—The duty, which previous to 1832 was 2*s.* per lb., was then reduced to 4*s.* per cwt. In 1845 the duty was repealed.

Balsam Peru, Tolu, and unenumerated Balsams.—The duty, which previous to 1832 was 4*s.* 6*d.* per lb. on all, was then reduced to 1*s* per lb. on Peru, 2*s.* per lb. on Tolu, the duty on unenumerated balsams remaining at 4*s.* 6*d.* per lb. In 1842 a further reduction took place on Peru to 3*d.*, on Tolu to 2*d.*, and on unenumerated balsams to 6*d.* per lb. In 1845 the duty on all was repealed. We import b. Canada from North America, and b. Peru and Tolu from South America.

Benzoin.—Previous to 1832 the duty was 2*s.* per lb., when it was reduced to 4*s.* per cwt. In 1842 it was further reduced to 1*s.* per cwt.; and in 1845 was repealed. We obtain our supply of this article from the East Indies; and export to America, Australia, &c.

Berries, Juniper.—The duty, which had previously been 11*s.* 1*d.* per cwt., was reduced in 1832 to 2*s.*; and in 1842 to 1*s.* per cwt.; and repealed in 1845. We import juniper berries from Italy and the Mediterranean.

Camphor.—The duty, which before 1832 was 10*d.* per lb. on refined, and 5*d.* on unrefined, was then fixed at 40*s.* per cwt. on refined, and 1*s.* on unrefined. In 1842 the duty on refined was fixed at 10*s.* per cwt., and on unrefined at 1*s.* per cwt. In 1845 the duty on unrefined was repealed; and the duty on refined was fixed at 5*s.* per cwt., at which it still remains. We obtain our supply of camphor from the East Indies and China; and export it to Russia, America, and the Mediterranean.

Cantharides.—Previous to 1832 the duty was 3*s.* 6*d.* per lb., it was then reduced to 1*s.*; and in 1842 to 3*d.* per lb., at which it still remains. We obtain our supplies of cantharides from the ports of Russia and the Mediterranean, and export to North America, Canada, and Australia.

Cardamoms.—The duty was reduced in 1832 from 2*s.* to 1*s.* per lb.; and in 1842 to 2d. In 1845 the duty was repealed. We obtain cardamoms from the East Indies.

Castor.—Previous to 1832 the duty was 5*s.* per lb., when it was reduced to 6*d.* In 1842 it was further reduced to 2*s.* per cwt.; and in 1845 was repealed. We obtain castor from North America.

Camomile Flowers.—Previous to 1832 the duty was 6*d.* per lb., at which time it was reduced to 3*d.*; and to 1*d.* per lb. in 1842. In 1845 the duty was repealed. We import camomiles from Holland, &c.

Colocynth.—The duty was reduced in 1832 from 1*s.* 8*d.* per lb. to 2*d.*; and in 1842 to 1*d.* In 1845 the duty was repealed. We import colocynth from Turkey and the Mediterranean ports.

Columbo Root.—The duty, which previous to 1832 was 2*s.* per lb., was then reduced to 2*d.*; and in 1842 to 1*s.* per cwt. Duty repealed in 1845. We import this root from the East Indies.

Cream Tartar.—The duty was reduced in 1832 from 4*s.* 6*d.* per cwt. to 2*s.*, and in 1842 to 1*s.* per cwt. In 1845 the duty was repealed. France and the ports of the Mediterranean furnish us with this article.

Cubebs.—The duty, which previous to 1832 was 2*s.* per lb., was then reduced to 6*d.*, and in 1842 to 1*d.* per lb. In 1845 the duty was repealed. We import cubebs from the East Indies.

Drugs unenumerated.—The duty, which previous to 1832 was 20*s.* per cent. *ad valorem*, was then reduced to 10*s.* per cwt., and in 1836 to 2*s.* per cwt. In 1842 it was fixed at 1*s.* per cwt., and in 1845 repealed.

Galls.—The duty, which in 1826 was 11*s.* 2*d.*, and subsequently reduced to 5*s.* per cwt., underwent a further reduction to 2*s.* per cwt., in 1832, and to 1*s.* in 1842. In 1845 the duty was repealed. We import galls from the East Indies and the Mediterranean.

Gamboge.—The duty, which, previous to 1832, was 1*s.* 8*d.* per lb., was then reduced to 4*s.* per cwt., and in 1842 to 1*s.* per cwt. In 1845 the duty was repealed. We import gamboge from the East Indies.

Gentian.—The duty, which previous to 1832 was 6*d.* per lb. was then reduced to 4*s.* per cwt., and in 1842 to 5*s.* per ton. In 1845 the duty was repealed. We import gentian from France, Germany, Switzerland, and the ports of the Mediterranean.

Gum Ammoniacum.—Previous to 1832 the duty was 1*s.* 3*d.* per lb., then reduced to 6*s.* per cwt., and in 1842 to 1*s.* per cwt. In 1845 the duty was repealed.

Gum Fœtid.—The duty which previous to 1832, was 10*d.* per lb., was then reduced to 6*s.* per cwt., and in 1842 to 1*s.* per cwt. In 1845 the duty was repealed. We import these gums from the East Indies.

Guaiacum.—The duty, which previous to 1832 was 3*d.* per lb. on the produce of any British possession, and 1*s.* 10*d.* on that of any other part, was then fixed at 6*s.* per cwt. on all sorts, and further reduced to 1*s.* per cwt. in 1842. In 1845 the duty was repealed.

Gum Kino.—The duty, which previous to 1832 was 1*s.* 6*d.* per lb., was then reduced to 6*s.* per cwt., and in 1842 to 1*s.* per cwt. The duty was repealed in 1845. We import these gums from Trieste and the ports of the Mediterranean, also from the East and West Indies.

Hellebore Root.—The duty, which previous to 1832 was 6*d.* per lb., was then reduced to 1*d.* per lb.; and in 1842 to 3*s.* per cwt. In 1845 the duty was repealed. We import hellebore from France, Germany, and the Mediterranean ports.

Isinglass.—The duty, which previous to 1842 was 47*s.* 6*d.* per cwt. on produce of foreign countries, and 15*s.* 10*d.* on that of British possessions. was then fixed at 5*s.* for British possessions, the duty on foreign remaining as before. In 1845 a uniform rate of 5*s.* per cwt. was placed on all sorts, which still remains. We import isinglass from Russia and Brazil.

Jalap.—Previously to 1832 the duty was 2*s.* per lb., it was then reduced to 6*d.* per lb., and to 1*d.* in 1842. In 1845 the duty was repealed. We import jalap from South America.

Manna.—The duty, which previously to 1832 was 1*s.* 3*d.* per lb., was then reduced to 3*d.*, and in 1842 to 1*d.* per lb. In 1845 the duty was repealed.

Moss, Lichen Island.—The duty previously to 1832 was 8*d.* per lb. ; it was then reduced to 1*d.* per lb., and in 1842 to 5*s.* per ton. The duty was repealed in 1845. We import this moss from the north of Germany.

Musk.—Previously to 1832 the duty was 5*s.* per ounce; it was then reduced to 6*d.* per ounce, and in 1845 repealed. We import musk from China.

Myrrh.—The duty, which previously to 1832 was 1*s.* 8*d.* per lb., was then reduced to 6*s.* per cwt., and in 1842 to 1*s.* per cwt. The duty was repealed in 1845. We import myrrh from the East Indies, &c.

Oils, Essential.—In 1832 the duty on oil of *Aniseed* was reduced from 4*s.* per lb. to 1*s.* 4*d.*, and in 1842 to 1*s.* per lb. ; oil of *Bergamot* from 4*s.* 6*d.* to 1*s.* 4*d.* in 1832 ; and in 1842 to 1*s.* per lb. ; oil of *Cajeput* from 1*s.* per ounce to 1*s.* 4*d.* per lb. in 1832, and to 1*s.* in 1842 ; oil of *Caraway* from 4*s.* to 2*s.* per lb. in 1842, and in 1845 to 1*s.* per lb. ; oil of *Cassia* from 1*s.* per ounce to 1*s.* 4*d.* per lb. in 1832, and to 1*s.* per lb. in 1842 ; oil of *Cinnamon* from 1*s.* per ounce to 1*s.* 4*d.* per lb. in 1832, and to 1*s.* per lb. in 1842 ; oil of *Cloves* from 2*s.* per ounce to 14*s.* per lb. in 1832, then to 4*s.* in 1842, and to 3*s.* per lb. in 1845 ; oil of *Juniper* from 2*s.* per lb. to 1*s.* 4*d.* in 1832, and to 1*s.* in 1842 ; oil of *Lavender* from 4*s.* per lb. to 2*s.* in 1842, and to 1*s.* per lb. in 1845; oil of *Lemon* from 4*s.* 6*d.* per lb. to 1*s.* 4*d.* in 1832, and to 1*s.* per lb. in 1842 ; oil of *Nutmegs* from 2*s.* 6*d.* per ounce to 1*s.* 4*d.* per lb. in 1832, and to 1*s.* per lb. in 1842 ; oil of *Peppermint* from 4*s.* per lb. to 2*s.* in 1842, and to 1*s.* per lb. in 1845.

Otto of Roses, the duty on which had previously been reduced from 6*s.* to 2*s.* per ounce, was further reduced to 1*s.* 4*d.* per lb. in 1832, and to 1*s.* per lb. in 1842; oil of *Rosemary* from 4*s.* per lb. to 1*s.* 4*d.* in 1832, and to 1*s.* per lb. in 1842; oil of *Rhodium* from 5*s.* per ounce to 1*s.* 4*d.* per lb. in 1832, and to 1*s.* per lb. in 1842; oil of *Spike* from 4*s.* per lb. to 2*s.* in 1842, and to 1*s.* per lb. in 1845; oil of *Thyme* from 4*s.* per lb. to 1*s.* 4*d.* in 1832, and to 1*s.* per lb. in 1842. The duty on all chemical, essential, and perfumed oils remains at 1*s.* per lb.; with the exception of oil of cloves, which pays a duty of 3*s.* per lb. We import the oils of anniseed, cassia, cajeput, cinnamon, cloves, and nutmegs from the East Indies; the oils of caraway, juniper, lavender, rhodium, rosemary, spike, and thyme, from France, Holland, and Germany; the oils of lemon and bergamot, from Messina, and the otto of roses from Turkey, &c.

Orris Root.—The duty, which previous to 1832 was 28*s.* 6*d.* per cwt., was then reduced to 10*s.*, and in 1842 to 5*s.* per cwt. In 1845 the duty was repealed. We import orris root from Trieste and the ports of the Mediterranean, and Africa.

Quinine (Sulphate).—The duty, which had previously been reduced from fifty per cent. *ad valorem* to 2*s.* 6*d.* per ounce, by Treasury order in 1825, was further reduced to 1*s.* in 1832, and in 1836 to 6*d.*, at which it still remains. We import quinine from France and Germany.

Radix Ipecacuanhæ.—The duty, which in 1826 was 4*s.* per lb., and subsequently reduced to 1*s.* 8*d.*, was in 1832 further reduced to 1*s.* per lb. In 1845 the duty was repealed. We import ipecacuanha from South America.

Saffron.—The duty, which previous to 1832 was 2*s.* 6*d.* per lb., was then reduced to 1*s.* per lb. The duty was repealed in 1845. We import saffron from France and Spain.

Sanguis Draconis.—The duty, which previously to 1832 was 1*s.* 8*d.* per lb., was then reduced to 4*s.* per cwt. The duty was repealed in 1845. We import dragon's blood from the East Indies.

Sarsaparilla.—The duty which previous to 1832 was 1*s.* per lb. on the produce of British possessions, and 1*s.* 3*d.* on that of other countries, was then fixed at a uniform rate of 6*d.* per lb., which in 1842 was further reduced to 1*d.*, and repealed in 1845. We import sarsaparilla from the West Indies, Brazil and Mexico.

Sassafras.—The duty, which previous to 1832 was 6*s.* 4*d.* per cwt., was then reduced to 2*s.*, and in 1842 to 6*d.* per cwt. In 1845 the duty was repealed. We import sassafras from North America.

Scammony.—The duty, which previous to 1832 was 6*s.* 4*d.* per lb., was then reduced to 2*s.* 6*d.*, and in 1842 to 6*d.* per lb. In 1845, the duty was repealed. We import scammony from Turkey, Smyrna, and Aleppo.

Seeds Anise.—Previously to 1832, the duty was 60*s.* per cwt.; it was then reduced to 5*s.*, and in 1842 was fixed at 2*s.* 6*d.* per cwt. on the produce of British possessions, and 5*s.* on that of foreign parts. The duty was repealed in 1845. We import anise seeds from the Mediterranean.

Senna.—The duty, which previous to 1832 was 1*s.* 3*d.* per lb., was then reduced to 6*d.*, and in 1842 to 1*d.* per lb. In 1845, the duty was repealed. We import senna from the East Indies, Alexandria, Smyrna, and Tripoli.

Squills.—The duty, which previous to 1832 was 20*s.* per cwt. on dried, and 5*s.* on undried, was then fixed at 8*s.* per cwt. on the former, and 1*s.* on the latter. In 1842 the duty was fixed at 1*s.* on dried, and 6*d.* on undried. In 1845 the duty was repealed. We import squills from Trieste, &c.

Tamarinds.—The duty, which previous to 1833 was 6*d.* per lb. on the produce of or from any British possessions within the limits of the East India Company's Charter; 2*d.* per lb. of or from any other British possession in America or Western Coast of Africa, and 8*d.* per lb. on the produce of other countries, was then fixed at 1*d.* per lb. of or from any

British possessions, and 8*d.* of other parts. In 1842 the duty was fixed at 1*d.* per lb. on the produce of British possessions, and 3*d.* on foreign, at which it still remains. We import tamarinds from the East and West Indies.

The export of most of the articles above mentioned is to our colonial possessions, and is but of small amount.

The returns of the Board of Trade, the Mercantile Price Currents, and information obtained from Importers, are the sources whence the contents of the above and former article were obtained.

THE EFFECT OF CHANGES IN THE DUTIES ON DRUGS.

The following Table indicates the amount of duty received on certain drugs, &c., during the years specified, and shows the loss to the revenue, arising from the several reductions and repeal of the duties.

SCHEDULE *A.*

Articles, the Duty on which has been reduced at various times, but not repealed.

	1830.	1838.	1840.	1842.	1843.	1845.	1846.
	£	£	£	£	£	£	£
Almonds, Jordan	9,367	3,165	3,373	2,553	3,133	2,954	3,222
———— other sorts....	6,665	3,690	4,144	3,710	2,374	3,722	3,935
Arrow-root	2,204	393	441	737	623	631	394
Cantharides	2,703	922	952	395	178	175	197
Cassia	1,624	2,521	1,933	1,692	1,709	1,911	1,800
Caraway Seeds	4,336	316	918	1,753	2,272	1,792	2,297
Cinnamon	709	417	411	296	242	314	339
Cloves	6,061	2,697	2,219	2,380	2,622	2,958	1,253
Ginger	3,560	6,517	6,228	2,798	2,802	4,160	4,122
Isinglass	3,420	4,058	3,810	3,887	3,485	732	439
Liquorice, Juice & Paste	21,192	27,181	26,535	16,359	14,204	14,789	13,323
Mace........................	2,205	2,552	2,183	2,496	2,674	2,282	2,494
Nutmegs	15,158	15,614	15,040	21,901	20,527	14,191	22,313
Oil, Bergamot .... }	3,088	812	993	748	794	902	791
——Lemon .... }		179	1,669	1,232	1,468	1,691	2,092
——Cassia	882	302	212	63	83	97	348
——Cloves	2	4	Nil.	115	96	88	136
——Roses	719	71	64	53	25	44	57
——Thyme	1,417	793	609	420	392	449	492
——Caraway ....}	1,681	349	271	109	26	93	73
—— Lavender ....}		954	509	667	834	505	409
——Mint ....}		85	66	41	10	17	
——Peppermint.......}		507	1,414	924	650	729	680
——other sorts ......}		1,324	1,424	814	1,097	1,389	1,632
Opium	4,528	1,557	2,426	2,497	1,729	2,094	1,826
Pepper......................	100,492	65,771	70,593	70,345	71,985	84,230	86,680
Pimento	7,249	4,236	4,376	1,833	942	1,150	916
Sago	1,624	1,426	1,793	2,709	2,203	2,263	1,293
Sulphate of Quinine ...	180	2,543	580	1,690	1,622	1,235	994
Tamarinds	1,179	636	572	611	888	508	552
Tapioca	266	56	69	115	171	372	300
£	202,511	151,648	156,027	145,943	141,860	148,364	155,390

SCHEDULE *B*.

ARTICLES, the Duty on which was reduced at various times, and altogether repealed in 1845.

	1830.	1838.	1840.	1842.	1843.	1845.	1846.
	£	£	£	£	£	£	
Almonds, Bitter	2,242	389	462	247	232	52	Nil.
Aloes	4,210	1,019	1,261	296	314	160	"
Ambergris	47	7	46	26	25	1	"
Angelica	520	90	88	53	63	Nil.	"
Annatto	1,246	142	170	217	194	28	"
Argol	2,040	442	551	410	743	108	"
Balsam, Canada	147	31	32	59	47	5	"
——— Capivi	4,791	66	219	161	209	33	"
——— unenumerated	324	235	259	82	40	7	"
Bark, Peruvian	320	450	207	46	39	9	"
Berries, Juniper	5,680	608	1,068	735	434	52	"
Boracic Acid	5,282	1,650	971	798	361	89	"
Borax	1,626	770	764	162	5	1	"
Camphor, unrefined	265	34	33	40	39	15	"
Cardamoms	508	234	330	64	34	11	"
Colocynth	446	126	82	59	50	14	"
Columbo Root	1,060	167	93	23	9	1	"
Cream of Tartar	2,654	1,301	1,421	913	1,169	171	"
Cubebs	1,854	834	853	365	182	24	"
Drugs not enumerated	137	36	36	173	22	2	"
Gamboge	582	20	14	4	8	1	"
Gentian	875	102	130	12	9	2	"
Gum Ammoniac	207	14	36	3	6	1	"
—— Arabic	6,375	4,931	5,454	2,161	1,065	222	"
—— Assafœtida	152	18	25	6	6	Nil.	"
—— Benzoin	756	283	148	69	52	"	"
—— Guaiacum	94	12	29	6	3	1	"
—— Tragacanth	1,410	181	99	22	22	2	"
Hellebore	219	134	125	63	13	Nil.	"
Jalap	3,612	1,101	1,149	617	260	23	"
Manna	1,146	189	264	50	95	6	"
Moss, Lichen Island	352	32	38	2	2	Nil.	"
Musk	374	62	53	97	128	10	"
Myrrh	1,206	55	46	9	10	4	"
Ol. Castor	4,223	351	459	252	461	76	"
Orris Root	149	91	118	63	48	33	"
Quicksilver	4,952	1,694	1,422	1,134	1,108	189	"
Radix Ipecacuanhæ	776	633	329	574	412	54	"
——— Serpentariæ	416	13	3	46	20	1	"
Rhubarb	4,324	2,269	2,127	968	793	79	"
Saffron	670	289	172	282	286	36	"
Sanguis Draconis	225	16	8	17	10	4	"
Sarsaparilla	5,950	3,581	3,573	812	753	180	"
Sassafras	159	25	61	29	18	5	"
Saltpetre and Nit. Soda	3,691	7,505	8326	8,955	10,096	1,450	"
Scammony	2,287	1,012	1,538	341	287	40	"
Seed Annis	1,265	86	78	170	77	23	"
Senna	9,027	4,886	5,385	1,798	1,329	184	"
Squills	282	34	82	16	12	Nil.	"
Sulphur	6,629	17,046	11,199	8,326	17,216	2,211	"
Wax, Bee's	5,893	3,921	3,562	1,265	711	64	"
£	103,657	59,217	54,978	33,098	39,527	5,684	

DR. DAUBENY, PRESIDENT IN THE CHAIR.

The following papers were read :—

On the Composition of the Waters of the Dee and Don at Aberdeen, with an Investigation into the Action of Dee Water on Lead Pipes and Cisterns. By John Smith, M.D., Fordyce Lecturer on Agriculture, and Assistant in the Chemical Laboratory of Marischal College.

The subject of this paper is discussed under the following heads :—

1. *General characters of the districts drained by the rivers Dee and Don.*—The sources of the Dee lie amidst lofty granite mountains. The length of country traversed by it is about 80 miles, or 65 miles in a straight line, and the extent of country which it drains about 900 square miles. Its banks are gravelly, its flow pretty rapid, and the alluvial deposits few, and of limited extent. From the small proportion of clay and peat in its course, its waters are usually quite clear.

The water for the supply of Aberdeen is taken from the Dee about two miles from its mouth, and quite beyond the reach of the tide water. It percolates through the gravelly sides and bottom of the river into drains, and is there pumped to the highest level of the town. It is distributed through iron mains, and taken into the houses by small lead pipes, to which lead cisterns, generally of small dimensions, are commonly attached. The supply is constant, and amounts to about one million gallons per day.

The sources of the Don lie immediately north of the districts drained by the Dee, and comprise a less extensive area, including mossy ground, encircled by granite hills. Its course is about 60 miles in length to Aberdeen, or about 45 miles in a straight line. The mountains among which it runs contain more limestone than is found in those about the Dee. Hence the waters of the Don contain more lime, and are more coloured by peat than those of the Dee.

2. *Composition of Dee Water.*—A specimen taken some miles up the river, on the 24th of September, 1850, three days after heavy rain, was found to contain in the gallon, four grains of solid matter, consisting of

Carbonate of lime	0.850	grains
Sulphate of lime	0.121	"
Sulphate of magnesia	0.323	"
Chlorides of potassium and sodium	0.670	"
Phosphates of lime and iron	0.080	"
Silica	0.140	"
Organic matter and loss	1.816	"
	4.000	"

This specimen had a brownish tint, whereas the Dee water is generally colourless, and in other respects it was less pure than usual. A second specimen, taken when the river was in its usual clear and transparent state, yielded three grains of solid matter from the gallon, of which only 0.4 of a grain was organic matter, or volatilized by heat.

3. *Composition of Don Water.*—Two specimens of this water were examined, one taken about a mile from the mouth of the river, and the other about thirty-five miles higher up. The former was found to contain 8.65 grains of solid matter in the gallon, of which three grains consisted of organic matter; the latter contained five grains of solid matter in the gallon, of which 1.2 grains was organic. The composition of the solid contents of a gallon of the first specimen is thus represented:—

Carbonate of lime	2.18	grains
Sulphate of lime	.17	"
Sulphate of magnesia	1.00	"
Chlorides of potassium and sodium	1.32	"
Phosphates of lime and iron	.38	"
Silica	.60	"
Organic matter	3.00	"
	8.65	"

4. *Action of Dee Water on Lead.*—About forty trials were made with the view of ascertaining the action of Dee Water on the pipes through which it is conveyed to the houses. These pipes vary from twelve to one hundred yards in length. In some instances no indications of the presence of lead, in the water which had passed through the pipes, were found; in others, however, small quantities of lead were detected in solution. The quantities varied from less than $\frac{1}{100}$th of a grain to about $\frac{1}{20}$th of a grain of lead in a gallon of the water.

From an inquiry into the influence of the use of this water upon the health of the inhabitants of Aberdeen, in connexion with what has been observed elsewhere, the author concludes that less than $\frac{1}{20}$th of a grain of lead in the gallon of water produces no deleterious effect upon the health of those using the water for dietetical purposes, and that the limit of the deleterious action is between $\frac{1}{10}$th and $\frac{1}{20}$th of a grain of lead to the gallon of water.

On a Peculiar Property of Ether and some Essential Oils. By Dr. C. F. Schoenbein.

The property referred to by the author is similar to that which phosphorus has been long known to possess, when put, under certain circumstances, in contact with pure oxygen, or with atmospheric air, of developing a highly oxidizing agent, which has been called ozone.

The author finds that if a little pure ether be put into a bottle filled with pure oxygen or atmospheric air, and exposed to diffused light, the bottle being occasionally shaken, the ether, after the lapse of four months, will have acquired new properties. Although producing no action upon blue litmus paper, it will discharge the colour of solution of indigo, convert pure phosphorus, when immersed in it, into phosphorous acid, eliminate iodine from iodide of potassium, change pure sulphate of protoxide of iron to the basic and acid sulphates of the deutoxide, transform yellow prussiate of potash into the red salt, convert sulphuret of lead into the sulphate, &c. Similar effects are produced with oil of turpentine and oil of lemons when treated in the same way as the ether.

The author expresses an opinion that the property which these substances thus acquire, is due to the presence of oxygen in a chemically exalted condition.

REVIEWS.

PHARMACOPŒIA COLLEGII REGALIS MEDICORUM LONDINENSIS. MDCCCLI.

In the present Pharmacopœia, the progress of chemical science is denoted more by the omissions than by the new matter which is introduced. It was, formerly, considered necessary to give explicit instructions for the manufacture of numerous preparations and compounds which have now become regular articles of commerce. In proportion to the advancement of the practical skill of the manufacturing Chemist, the principle of the division of labour is developed; the physician describes those remedial agents which he requires for use, the Chemist adopts such processes as his experience suggests for their preparation. We, therefore, find in each successive Pharmacopœia, a greater latitude given to the manufacturer in matters of detail, while the Pharmacopœia approximates more nearly to a list of medicinal substances, and a collection of conventional formulæ.

In the work now before us, many of the acids, the alkaloids, the preparations of potash, soda, lime, silver, lead, and zinc, are transferred from the list of "Preparations" to the "Materia Medica," a description of the result required being substituted for detailed instructions as to the process. A few chemical processes which are easy of adoption on the small scale, are retained, and some new ones added, in order to enable the dispensing Chemist to make the preparations, in case he should suspect those offered for sale. We think some of the processes already retained are unnecessary.

The abortive endeavour to keep pace with the fluctuating tide of chemical science, by adapting the names of substances to their supposed elementary constitution, has been abandoned. It is admitted in the preface that ambiguity may arise from unnecessary changes in the names of substances sanctioned by usage, and that, in this respect, it is safer to be in the rear, than in advance of science. The truth of this proposition has been frequently demonstrated, and the Pharmacopœia of 1836 furnishes numerous illustrations of the danger and inconvenience of a rigid adherence to a professedly scientific system of nomenclature. In the present edition, there is a manifest improvement, the examples of ambiguity being much less numerous. Errors have been corrected in a few instances, in which no ambiguity could arise from the change. Sesquisulphuret of antimony is now called tersulphuret. Trisnitrate of bismuth has resumed its old name of nitrate. The cinchonas are described as yellow, pale, and red; and when the variety is not mentioned, the yellow is to be used. The more familiar name, Buchu, is substituted for Diosma. Sesquicarbonate of soda is called bicarbonate, which is its previously recognised name, and tincture of camphor is sent back to the spirits, with which it was formerly associated.

But while abstruse chemical science has thus yielded the palm to practical common sense, a similar victory has not yet been gained over caprice. We still find a few examples of inconvenient changes, the object of which it is impossible to conjecture. Of these the most extraordinary is the change of the name Extractum colocynthidis compositum for Pilula colocynthidis composita. This preparation was introduced into the Pharmacopœia of 1720 as Pilulæ rudii; in 1745 it was called Extractum catharticum; in 1787 it settled down into compound extract of colocynth, by which name it has been known all over the world up to the present time. The term is quite correct. It is a compound preparation, the base of which is extract of colocynth; it contains extract of aloes, and scammony which is also an extract. Yet it is removed from the extracts, and a name is applied to it already denoting two other preparations (of the Edinburgh and Dublin Pharmacopœias), one of which is in general use in England. The compound colocynth pill (properly so called) contains not the extract but the powder of colocynth, and although the two preparations are analogous in their nature (both being purgatives), the object of confounding them under the same name is unintelligible.

Among the harmless but unmeaning alterations we may observe, that the word *compound* is taken away from linimentum hydrargyri and added to ceratum saponis and tincture of catechu, all of which preparations are equally entitled to the adjective. In the former Pharmacopœia the pills were designated in the plural number, "Pilulæ rhei compositæ," &c., which is incorrect, as the formula describes a *pill mass*, and the plurality commences when the mass is divided into pills. This is now corrected, but the same principle is erroneously applied to flowers, leaves, figs, prunes, almonds, &c., which are all described in the singular number. Half a pound of a pill mass is a correct expression, but half a pound of a rose petal or a leaf implies rather a ludicrous extension of the rule respecting "nouns of multitude." In numerous formulæ the quantities are altered, the proportions remaining the same. The objection belonging to the unnecessary change of names applies equally to the alteration of the strength of preparations without a corresponding change in the name. For example, tincture of jalap is now reduced to half its former strength; tincture of ammonio-chloride of iron is diluted with an equal quantity of water. Tincture of cubebs is increased to more than three times its former strength. Dr. A. T. Thomson's syrupus ferri iodidi is introduced, but the strength is increased fifty per cent. We are not calling in question the prerogative of the College of Physicians to regulate the strength, doses, and composition of the preparations in the Pharmacopœia as they may think best, but it is not too much to ask for consistency and perspicuity in the orders given and the terms employed.

We now proceed to notice briefly the several additions and alterations in the section of the Pharmacopœia devoted to the preparations. These, as before, are arranged in groups in alphabetical order. Among the acids, acidum aceticum, which is transferred to the Materia Medica, is replaced by acidum aceticum dilutum. This is identical in strength with acetum destillatum, which in the Pharmacopœia of 1809 was called acidum aceticum, and, in 1824, acidum aceticum dilutum. It is one-seventh the strength of acidum aceticum of 1836 and 1851. Acetum destillatum is retained in the Pharmacopœia, but is not an ingredient in any of the preparations. It differs from acidum aceticum dilutum only in being not quite pure.

Acetum cantharidis is not altered. It is an inefficient preparation as a blister; but useful as a counter-irritant.

In acetum colchici the cormus is ordered dry instead of fresh, the quantity being proportionately reduced. This is an improvement, as the preparation is more uniform.

Benzoic, citric, hydrochloric, nitric, and tartaric acids are transferred to the Materia Medica.

The strength of nitric acid* is reduced from sp. gr. 1.5 to 1.42. The diluted acid is made in the proportion of three ounces of the strong acid to seventeen ounces of water, instead of one ounce to nine ounces. The strength is, however, nearly the same, being 1.082, instead of 1.080.

Acidum Sulphuricum dilutum in 1809 was made nearly twenty-five per cent. stronger than before. It is again slightly changed, the proportions being fifteen fluid drachms to a pint of distilled water, instead of ℥iss to ℥xivss. The sp. gr. is now 1.103 : it was 1.11, a difference of no practical importance.

Æther sulphuricus (now called simply æther) is trausferred to the Materia Medica. Chloroformyl is introduced among the preparations. In the process given, the method of purification consists in shaking the product for an hour with chloride of calcium, and re-distilling. It is stated by some Chemists, that purification by oil of vitriol is necessary. By whatever means the purification is effected, it is necessary always to test chloroform by litmus paper before using it, and if any acid re-action or bleaching of the paper be observed, it should be again purified.

Spiritus ætheris nitrici is the same as before, but the proportions of the ingredients are altered on account of the reduced strength of the acid.

Aconitina is omitted; liquor ammoniæ, morphia and its salts, quina, strychnia, and veratria are transferred to the Materia Medica, to which atropia is added. Among the preparations, liquor ammoniæ citratis is introdnced, also atropiæ sulphas, liquor morphiæ acetatis, and liquor morphiæ hydrochloratis. The strength of these morphia solutions is eight grains to the ounce, being more than fifty per cent. stronger than the corresponding solutions in the Edinburgh and Dublin Pharmacopœias.

The class "animalia" is omitted among the preparations.

Carbo animalis purificatus is transferred to the Materia Medica, where it is described as "*Carbo e Sanguine Bovino igne præparatus.*" It was formerly prepared by treating common animal charcoal (burnt bones, &c.) with hydrochloric acid. The term *carbo* is now used to denote carbo ligni. Cornu ustum is transferred to the Materia Medica. Testæ præparatæ are omitted.

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* Since 1721, nitric acid has passed successively through the names, aqua-fortis simplex, aqua-fortis duplex, spiritus nitri glauberi, acidum nitrosum, and acidum nitricum.

In the distilled waters, the spirit is omitted. When made with the essential oils, powdered silex or fine sand is ordered, instead of magnesia. The oil is to be triturated with the silex, the water added gradually, and strained. Magnesia absorbs a considerable portion of the oil, and is to a slight degree dissolved in the water. The same applies to chalk, which is sometimes used. The silex serves mechanically to divide the oil, and is not liable to the above objection. Aqua rosæ and aqua sambuci are excluded from the waters, which may be prepared from the oil. Aqua florum aurantii is omitted, being imported from France, where the fresh flowers can be obtained.

Among the cataplasms, cataplasma carbonis, and cataplasma sodæ chlorinatæ are added. In cataplasma conii, powdered instead of bruised linseed is ordered, and in cataplasma fermenti, flour is substituted for linseed powder. The vinegar is properly omitted in cataplasma sinapis, as it counteracts the development of the pungent essential oil on which the efficacy of the application depends. Cataplasms come rather within the province of the nurse than the Chemist.

No material change is made in the cerates. Confectio amygdalæ is ordered to be kept in a pulverulent state, the almonds being partially dried, rubbed through a fine metallic sieve, and then triturated with the sugar and gum previously powdered. In this state, the confection is less liable to spoil by keeping.

Confectio aromatica in the last Pharmacopœia was ordered as a powder, no allowance being made for the water, when mixed for use. This error is now rectified, two drachms of water are to be added to each ounce of the powder to make ten drachms of the confection. We may observe, that creta *præparata*, not *præcipitata*, is ordered, the latter preparation not being introduced into the Pharmacopœia.

To the list of decoctions, five are added, namely, decoctum granati *radicis*, D. hæmatoxyli, D. gallæ, D. pareiræ, and D. taraxaci. The decoctum granati of the previous Pharmacopœia, made with the rind of the fruit, is retained, although this is believed to be comparatively a very inefficient preparation. The instructions for preparing decoctum sarsæ are entirely altered. It is now to be simply boiled down from four pints to two, instead of being simmered for four hours, the root taken out and bruised, and then simmered for two hours longer. This tedious process was formerly adopted, in the belief that the medicinal properties of the root resided in the woody fibre. The efficacy is now attributed to the bark, which is much more speedily exhausted. We may observe, that the order to boil down a certain quantity of water to half is very indefinite. This may be done rapidly or not, according to the quantity prepared at a time, or the heat employed. Half a pint of decoction may be made in a few minutes by this rule; a gallon or two would require above an hour. As a general rule, all decoctions should be simmered or boiled slowly. In decoctum ulmi, the bark is now ordered dry, liquorice root is ordered fresh. Uva ursi leaves are not to be bruised. Decoctum malvæ comp. and decoctum veratri are omitted.

Emplastrum ceræ is omitted. It was seldom used except in making emplastrum cantharides, for which purpose the ingredients are now ordered instead. Emplastrum belladonnæ is now to be made with soap plaster instead of adhesive plaster. The proportion of extract is also doubled. This plaster will not adhere to the skin so well as the former one, if at all. It will require an adhesive margin. A small quantity of resin is added to emplastrum saponis. Three new plasters are added to the list. Emplastrum cumini is an old acquaintance, and one not easily forgotton, as it is a difficult plaster to spread. It requires an adhesive margin. This plaster was contained in the Pharmacopœias of 1720, 1745, 1787, and 1809. The present formula is slightly altered by the addition of an ounce and a half (each) of oil and water to 4 lbs. of plaster. Formerly emplastrum thuris, or roborans, known by the public as "strengthening plaster," is now revived under the name of emplastrum ferri. Emplastrum potassii iodidi is a new plaster. It resembles a cerate, and is stated to be more suitable for spreading on linen than on leather. The usual vehicle for plasters would not answer in this case, being incompatible with iodide of potassium.

Enema assafœtidæ is added to the preparations. In enema colocynthidis, the simple extract is substituted for the compound, and the quantity diminished from two scruples to half a drachm in the pint. The strength of enema tabaci is reduced from half a drachm to a scruple in the half-pint.

In extractum aconiti, and the other extracts prepared from the fresh herb, the order to sprinkle the herbs with water is rescinded. Extractum colocynthidis is ordered to be made with cold water, three pounds of the pulp being macerated in half-a-gallon for thirty-six hours, frequently pressing it with the hand. The quantity of water is not nearly sufficient to cover the pulp, even under the pressure indicated. With a proper quantity of water the process is a good one. Extractum colocynthidis compositum will continue to be, as it always has been, an extract, although it is called by a new name. There is, however, an alteration in the process which is no improvement. Consequently the old extract and the new pill may be kept as distinct preparations. When the compound extract is ordered, there can be no mistake. When the compound pill is ordered, there will be a doubt between London, Edinburgh, and Dublin. Extractum gentianæ and extractum cinchonæ are ordered to be prepared by two macerations in cold water, and evaporation. Extractum nucis vomicæ is introduced. This is an alcoholic extract. Extractum stramonii being an aqueous extract is an inefficient and inelegant preparation. The alcoholic extract of the Edinburgh Pharmacopœia is much superior. Extractum taraxaci is ordered to be prepared in the same manner as extract of liquorice, by decoction and evaporation. Although the same process was contained in the last Pharmacopœia, a great improvement has subsequently taken place in the mode of preparing this extract, which we expected to have seen introduced. By sprinkling the root with water, bruising it, expressing the juice and evaporating this at a very moderate temperature, a much better extract is produced. Extractum sarsæ liquidum is now introduced for the first time. We think the formula might have been improved. We have found the best result to be obtained by three successive cold macerations, without boiling the root; and we doubt whether a fluid extract of the strength prescribed will maintain a uniform consistence. The usual strength of what is termed the "concentrated fluid extract" is such that one ounce is equivalent to sixteen ounces of the decoction. Even this preparation, unless continually shaken, deposits a portion of the extract, and the fluid extract of the Pharmacopœia is about a fifth stronger. The omission of a compound fluid extract is remarkable, as this is very much more in demand than the simple.

Most of the infusions remain unaltered. Infusum cinchonæ and inf. rosæ are ordered to be macerated for two hours instead of six. Inf. pareiræ, scoparii, and simarubæ are omitted, and infusum cinchonæ spissatæ is added. This (like the extract) is prepared by cold infusion.

The formula for linimentum camphoræ comp. is altered, but not improved. The mistake in linimentum saponis is corrected by the addition of a little water, and a diminution of the quantity of soap. Linimentum calcis is introduced. It resembles a liniment in common use under that name, but olive oil is substituted for linseed oil.

The mistake in the last Pharmacopœia in the formula for oxymel is now corrected. By some accident, acetic acid was ordered without dilution. It is now diluted in the proportion of seven ounces of the acid to eight of water.

(*To be continued*).

THE PHARMACOPŒIA OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON FOR 1851. Translated by a Physician. 12mo, London: Henry Renshaw, Strand.

"THE translation is neither elegant nor free, but it is literal and correct." This is the statement of the translator, and we have nothing to add to, or take from it.

The question has of late been much discussed, whether a Pharmacopœia should be published in Latin or in English? Pending the settlement of this abstract proposition, we think it ought to be published in both languages. In some respects, Latin is preferable; Latin is more generally intelligible in foreign countries; for lists of drugs and formulæ it is more convenient. It is more easy to read a Latin prescription than an English one. Probably this may depend partly on habit, partly on the condensation of the words by the contractions with which the profession is familiar. Latin is the more classical language, and accords with the antiquity of the Royal College of Physicians. But even this classical propensity may be carried to an extreme. Why, for example, should the classic veil be spread over the names of the Fellows and Licentiates? Carolus, Gulielmus, Georgius, Jacobus, Tristrannus, Christopherus, Johannes, Robertus, and the like, are not the real names, but corruptions, and when we see in the title page "Londini, apud Johannem Churchill, Princes Street, Soho," the absurdity of attempting to "do in London as they do in Rome" is apparent. Reverting to the text, Latin is not a convenient language for the notes and special instructions contained in a Pharmacopœia. These portions of the work being only referred to occasionally, do not become so familiar as the ordinary terms in prescriptions, and since all pharmaceutists and their apprentices are not profound classical scholars, it would certainly be more convenient, we might even say, safer, to give the explanatory details of the work in the vernacular tongue. But it might be urged by critics, that a Pharmacopœia part Latin, part English, would be a lame production. Granted. Objections on both sides might be met by the publication of an English as well as a Latin edition. The plan of uniting the two was formerly adopted in the United States, and is still followed in the Greek Pharmacopœia. In the former work, each alternate page was in Latin, the translation being on the other side; in the latter, each page is divided into columns, one Latin, the other modern Greek.

ANNUAL REPORT OF THE PROGRESS OF CHEMISTRY AND THE ALLIED SCIENCES. By JUSTUS LIEBIG, M.D., and H. KOPP. Edited by A. W. HOFMANN, Ph. D., and WARREN DE LA RUE, F.R.S. London: Taylor, Walton, and Maberly.

SINCE the death of Berzelius, who for many years gave an annual report of the progress of chemical science, this duty has fallen into the able hands of Liebig, assisted by the other professors of the University of Giessen, and Dr. Hofmann and Mr. Warren De la Rue, undertook to edit a translation of the work for English readers. The first report embraces two years, 1847-48. It is in two octavo volumes, making 1100 well-filled pages. Of the report for 1849 the first part only of the English edition has yet appeared, and in editing this Dr. Hofmann has been assisted by Dr. H. Bence Jones, in the place of Mr. Warren De la Rue.

It is obvious, on glancing over the pages of these volumes, that Chemists have not been idle during the period referred to; it appears too, that chemical investigation has been chiefly directed to the department of organic chemistry. Whatever has been done, however, that was worthy of being recorded, is reported here, with occasional criticisms.

There has never, perhaps, been a time when Chemists stood so much in need as they now do of the means which this work affords, of reviewing the progress of the science to which they are devoted. The number of original investigators has greatly increased, and the results of their labours are distributed through a great many scientific journals, published in different languages, to the whole of which but few readers have access. Moreover, in the department of organic chemistry, there are every year so many new compounds produced, which are not even mentioned in the works published for elementary instruction, that those who rely upon these sources for their information will often find themselves unacquainted with names which are in use among Chemists.

The report, however, is not confined to Chemistry; it includes those branches of physical science which are most closely allied to Chemistry. Thus, referring to the table of contents, we find the subjects arranged under the following heads: *molecular actions*, comprehending the cohesion and adhesion of liquids, endosmosis, &c.; *atomology*, comprehending crystallography, specific gravity, &c.; *thermology*, comprehending what relates to heat; *kinetics*, or the science of motion, including apparatus; *acoustics; optics; magnetism; electricity; inorganic chemistry; organic chemistry; analytical chemistry; technical chemistry.*

In order correctly to estimate the value of results obtained in so many branches of science, it was obviously necessary to enlist the services of men as reporters who were eminent for their attainments in each department; and in this respect Professor Liebig is well supported. It appears that the reports on molecular actions, electricity, and part of that on magnetism, are furnished by Professor Buff; those on diamagnetism, kinetics, acoustics, optics, and part of thermology, by Professor Zamminer; part of chemistry, by Professor Will; technical chemistry, by Professor Knapp; mineralogy, by Professor Ettling; and lastly, chemical geology, by Professor Diffenbach.

The authors state that "the labours in the field of chemistry, including its application to pharmacy, medicine, agriculture, the arts and manufactures, will be reported with minute accuracy, it being intended to insert a faithful, and, whenever necessary, a complete digest of each investigation." These abstracts are, of course, short, but they are generally sufficient to indicate the leading features of the papers to which they refer, and they are always accompanied by reference to the original papers.

The work is valuable and interesting not only to those who desire to know from year to year who have been the labourers, and what the subjects on which labour has been bestowed, and who are satisfied with a brief sketch of the results of these labours, preferring to take such on the authority of others, rather than incur the toil of culling for themselves what is new and valuable from the voluminous records of investigations, but to those also who use it as an index to the scientific journals of the year, and as a reference to the original papers, where the fullest details of results may be found.

We strongly recommend the work to the notice of those who desire to watch the progress of chemical investigation.

EXPERIMENTAL RESEARCHES ON ELECTRICITY, 24th to 27th series (inclusive). By **MICHAEL FARADAY**, D.C.L., F.R.S., &c. From the *Phil. Trans.* 4to, pp. 120. R. and J. E. Taylor.

THE LIFE OF THE HON. HENRY CAVENDISH, *including Abstracts of his more important Scientific Papers, and a Critical Inquiry into the Claims of all the alleged Discoverers of the Composition of Water.* By **GEORGE WILSON**, M.D., F.R.S.E. London: printed for the Cavendish Society, 8vo., pp. 478.

A Practical Treatise on Diseases of the Urinary and Generative Organs. By William Acton. 2d edition, 8vo., pp. 693. John Churchill.

An Inaugural Essay on Zoo-adynamia. By G. J. Zeigler, M.D. 8vo., pp. 64. Philadelphia: Lippincott, Grambo and Co.

TO CORRESPONDENTS.

A Member (Newcastle-on-Tyne).—The formula in the new London Pharmacopœia for unguentum hydrargyri nitratis, answers the description required. The ointment must be constantly stirred until cold.

Atropia (Holloway).—Steel might be used, though some prefer bone.

A Member (Plymouth).—We are not acquainted with any application better than oil for surgical instruments.

J. B. (Brighton).—To give full answers to the questions, including the three analyses required, would occupy about a week.

M. P. S. (Exeter.)—(1.) The oil of male fern is obtained from the rhizome.—(2.) Members have access to all parts of the house of the Society, and may introduce their friends as visitors to the library, museum, &c.

A Subscriber (Brighton).—Colchicum seeds are ordered to be bruised in making the wine and tincture.

P. J. (London).—Sapo mollis is described in the new Pharmacopœia as "Sapo ex olivæ oleo et potassa confectus." It is kept by many Chemists, being sometimes ordered in prescriptions. The late Mr. Vance prescribed it continually.

A Subscriber (Guernsey).—We cannot recommend the speculation as safe or proper.

M. P. S. (Bury St. Edmund's).—Tinct. kino. We can add nothing to the information contained in Mr. Redwood's paper on this subject, vol. i., p. 399.

Mr. Jones (Lincoln) has sent us a copy of the following advertisement, extracted from the *Stamford Mercury*, to give our readers an idea what a "snug trade" is and for how small a sum it may be purchased :—

> "To Chemists and Druggists.—For immediate Disposal under peculiarly advantageous circumstances, a Drug Business, doing a snug trade, and which is capable of great extension. Any young man who can command the low sum of £30 will find this an opportunity of entering into business of rare occurrence. The most satisfactory reasons given for leaving, &c. For further particulars, apply by letter, addressed A.B., 20, Post-office, Northampton."

X. Y. Z.—No medicine requiring a medicine stamp can legally be sold by any person not having a patent medicine licence.

W. H. V. (Tunbridge).—(1.) On application by letter to the Secretary, the required information may be obtained, with the form of certificate.—(2.) Chloride of silver is insoluble.

Mr. Parsons (of Leicester) requests us to state, that he is not the correspondent who made the inquiry, answered page 528 of our last number.

R. J. W. O.—(1.) The specimen of ammonia referred to, probably contains *pyrrol.* (See Pharm. Journal, vol. vi., page 29).—(2.) By analysis. (3.) No.—(4.) See any book on Chemistry.

Medicus.—Gadus Morrhua is the name applied by naturalists to the cod fish. The specific name is used to designate the oil.

The Report of the Meeting at Liverpool arrived too late.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. Smith, 17, Bloomsbury Square, before the 20th of the month.

Advertisements to Mr. Churchill, Princes Street, Soho.

Other Communications to the Editor (to the care of Mr. Churchill).

THE PHARMACEUTICAL JOURNAL.

VOL. X.—No. XII.—JUNE 1st, 1851.

THE GENERAL ADVANCEMENT OF SCIENCE.

EVERY attentive observer of what is passing around him must have been forcibly struck with the steady progress which Science has made during the last ten years. There is scarcely a man having any pretensions to a liberal education, who does not participate in the increasing interest which belongs to scientific pursuits. The rapid strides of steam power, in its various applications—the entire revolution in the means of locomotion—the electric telegraph—the advancement in chemical arts and manufactures—and the discussions on sanitary reform, have familiarized the public mind with those principles of philosophy which are becoming more closely identified with our social comforts and substantial interests.

The scientific institutions of this country have contributed to promote the same result, and among these we may mention, in the front rank, the Royal Institution, which was established for the advancement of Chemistry and Natural Philosophy, with reference especially to the application of science to the arts and manufactures. The British Museum, the Botanical Gardens, Polytechnic institution, and popular scientific societies have assisted in extending the field of knowledge, and diffusing useful information among the masses of the people.

His Royal Highness Prince Albert, instead of allowing his mind to be distracted with party politics, devotes his attention to the promotion of those arts and sciences which have a direct influence on the social and moral welfare of the public. His name is to be found as the patron of almost every useful undertaking of this nature, and whether the more immediate object be the extension of commerce—the advancement of art, science, or literature—the encouragement of industry, or the relief of distress, the willingness of the Prince to lend a helping hand is equalled only by his tact and ability in carrying out this intention.

The praiseworthy example of the Royal Consort is followed by the nobility and gentry, and thus a *prestige* is given to the arts and sciences which exercises a salutary influence on the community at large. The Royal College of Chemistry and the Agricultural Colleges furnish illustrations of this progressive improvement; and during the past month we had another example in the opening of the MUSEUM of PRACTICAL GEOLOGY, in Jermyn Street. This Institution has been for many years buried in Craig's Court, where its prosperity had outgrown its dimensions, and it was found necessary to provide more spacious accommodation in a better locality. The present building is admirably adapted for the object in view. On the ground-floor the hall is devoted to British marbles and varieties of stone; there is a lecture-room of six hundred capacity, and a well-filled library. The upper floor is the principal apartment, round which are two galleries. The upright cases contain minerals and ores, British and foreign, and in the horizontal cases are shown metallurgical processes and the applications of the results. There is an illustrative collection of china and glass, and in the galleries are geological specimens, including fossil remains and rock formations. Models of mining machinery, tools, safety-lamps, and other illustrations, are in an adjoining room, and one side of the gallery communicates with one of the most complete laboratories in London. The opening of the building took place on the 12th of May, under the auspices of his Royal Highness, attended by the members of the Government, and a very numerous audience, including many of the aristocracy, and the leading scientific men of the day.

Turning from this substantial fabric to the Crystal Palace, we find a monument of skill and industry which exceeds the most sanguine expectations of its original promoters. Under the same presiding genius, assisted by men of every rank and every branch of commercial enterprize, this undertaking has furnished a practical refutation of the arguments of its opponents, who (with the exception of Col. Sibthorp) have been obliged to surrender at discretion. We only hear a slight murmur of discontent at the stagnation of trade in certain quarters, and the comparative desertion of some other exhibitions, but this we believe to be a temporary lull, which will be succeeded by renewed activity. A hearty meal induces a tendency to sleep, but, by the aid of good digestion, it invigorates the constitution, and the " giant is refreshed." There is much to digest in the Great Exhibition.

While practical science and commercial enterprize have been progressing in every other direction, if the Chemists had remained inactive during the last ten years, without organization, without pretensions to professional standing, or zeal in the promotion of scientific advancement, they might have become a living illustration of the " *lucus a non lucendo*," bearing the name of Chemists, but left in the background by amateurs. Although the Pharmaceutical Society was called into existence by accidental circumstances, it was a move in the right direction; and although it has not yet accomplished all that is required, it has paved the way, and perseverance will achieve the rest. It is difficult to estimate correctly the amount of progress made by a class of the community, within a given period, under an improved system of education, as it impossible at once to spread the influence of the system over the entire body. The development of the improvement must inevitably be gradual, and the complete attainment of the result may be reserved for the succeeding generation; but those who observe what is passing around them, and who take an interest in the professional character of their calling, must feel a satisfaction in the consciousness that they are keeping pace with the times and rising in public estimation.

THE ARSENIC BILL.

This Bill passed the third reading on the 23d of May, with a few verbal alterations.

In the second clause the quantity " less than ten pounds weight at any one time," is omitted, the prohibition against selling arsenic to strangers, or to persons under full age, being general instead of applicable only to the sale of small quantities. The prohibition against selling arsenic " to any person other than a male person of full age," is altered by the omission of the word " male." We understand the British ladies were indignant at this aggression on their liberty, which they considered equivalent to a vote of " no confidence." The remonstrance could not be resisted, accordingly the ladies continue to enjoy, equally with the other sex, the privilege of purchasing, mixing, and administering, rat poison. In so doing, however, they will be in danger of soiling their fingers, and have only to make their election between soot and indigo.

The alteration in the fourth clause, which was suggested in our last number, page 531, has been made: no restriction being placed upon the ordinary business transactions between the wholesale and retail dealer. We believe no case is on record of an accident or crime arising from irregularities in this stage of the business. It is in the retailing of arsenic that the danger exists, and to this the remedy should be directed.

On the third reading of the Bill Mr. Wakley expressed a desire that it should be deferred for further consideration, as he objected to some of its provisions;—chiefly to the sale of arsenic to persons who cannot write. He also doubted the efficacy of the precaution of colouring arsenic with soot or indigo, and thought a more effectual Bill might be framed if the subject were referred to a Select Committee for further consideration.

Sir George Grey observed, in reply, that the advice of many practical men had been obtained; that it was not desirable to discuss the details of the subject publicly, and it was impossible to frame a Bill which should meet every contingency. He believed the Bill before the House would answer the purpose intended, and hoped it would be allowed to pass the third reading. The objection being withdrawn the Bill was passed.

We have not much faith in the precaution of colouring arsenic, which was fully discussed by the Poison Committee of the Pharmaceutical Society, and excluded from the report under the belief that it would not be effectual. In our opinion the value of the Act consists in this fact, that henceforth no person will be allowed to sell arsenic to a stranger; and that every sale of arsenic must be recorded either in the ledger of the wholesale dealer, or in the book kept by the retailer for that purpose, in accordance with the provisions of the Act. This will afford the means of tracing arsenic to the possessor, and will be a check upon the criminal, and an inducement to extra caution on the part of all persons who buy or sell arsenic.

THE GREAT EXHIBITION.

Some progress has been made since last month in the arrangement of the foreign Chemicals and Pharmaceutical preparations; but up to the present time the total amount of productions in this class, which we have seen from other countries, falls short of our expectations. We make no remark at present respecting the quality of the specimens, as the jurors are now engaged in the performance of their duties, which will probably occupy two or three weeks, after which time we hope to have the opportunity of publishing the official reports.

In other parts of this Journal will be found notices of some of the raw materials and products which appear deserving of attention from their novelty or other circumstances. From the extent and variety of objects collected from distant quarters of the globe, and deposited in the Great Exhibition, we have reason to believe that the fund from which information is to be drawn will not very soon be exhausted, and that we may be able to furnish a series of similar notices in future numbers. In these investigations we are favoured with the valuable assistance of Dr. Pereira, to whom we are indebted for numerous interesting contributions on subjects relating to the Materia Medica.

We subjoin a list of the classes into which the contents of the Exhibition are divided, with the number of jurors appointed in each class, from which the relative positions of the several classes will be seen, and the relation which each bears to the whole. Class II. comprises the objects more especially relating to our department. Classes I. and III. are collaterially allied to it, and in some other classes the products are more or less indebted to Chemical science for the perfection of the results.

		No. of Jurors.
	RAW MATERIALS.	
A. *Raw Materials.*	I. Mining, quarrying, metallurgical operations, and mineral products	8
	II. Chemical and pharmaceutical processes and products generally	8
	III. Substances used as food	6
	IV. Vegetable and animal substances chiefly used in manufactures, as implements, or for ornament	8
	MACHINERY.	
B. *Machinery.*	V. Machines for direct use, including carriages and railway and naval mechanism	12
	VI. Manufacturing machines and tools	12
	VII. Civil engineering, architectural and building contrivances	8
	VIII. Naval architecture and military engineering; ordnance, armour and accoutrements	8
	IX. Agricultural and horticultural machines and implements	*
	X. Philosophical instruments and processes depending upon their use; musical, horological, and surgical instruments	12
	MANUFACTURES.	
C. *Textile Fabrics.*	XI. Cotton	10
	XII. Woollen and worsted	12
	XIII. Silk and velvet	10
	XIV. Manufactures from flax and hemp	10
	XV. Mixed fabrics, including shawls, but exclusive of worsted goods (Class XII)	12
	XVI. Leather, including saddlery and harness, skins, fur, feathers, and hair	10
	XVII. Paper, and stationery, printing, and bookbinding	8
	XVIII. Woven, spun, felted, and laid fabrics, when shown as specimens of printing or dyeing	10
	XIX. Tapestry, including carpets and floor-cloths, lace, and embroidery, fancy, and industrial works	10
	XX. Articles of clothing for immediate, personal, or domestic use	8
D. *Metallic, Vitreous and Ceramic Manufactures.*	XXI. Cutlery and edge tools	6
	XXII. Iron and general hardware	12
	XXIII. Working in precious metals, and their imitation, jewellery, and all articles of vertu and luxury, not included in the other Classes	8
	XXIV. Glass	8
	XXV. Ceramic manufacture, china, porcelain, earthenware, &c.	8
E. *Miscellaneous Manufactures.*	XXVI. Decoration furniture and upholstery, including paper hangings, papier maché, and japanned goods	12
	XXVII. Manufactures in mineral substances, used for building or decoration, as in marble, slate, porphyries, cements, artificial stones, &c.	6
	XXVIII. Manufactures from animal and vegetable substances, not being woven or felted, or included in other sections	6
	XXIX. Miscellaneous manufactures and small wares	10
	FINE ARTS.	
F. *Fine Arts.*	XXX. Sculpture, models, and plastic art	1

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* The jury for agricultural implements is made exceptional, as the agricultural committee, consisting of eminent Members of the Royal Agricultural Society, have undertaken the functions of the jury. Foreigners may be added to this Committee if desired.

TRANSACTIONS
OF
THE PHARMACEUTICAL SOCIETY.

THE PRESIDENT'S CONVERSAZIONE.

In accordance with the practice which has been adopted by preceding Presidents, Mr. Ince concluded his year of office by entertaining the Members and Associates of the Society, together with a large number of medical and scientific men, at a Conversazione, which was held at the house of the Society, on Monday evening, the 19th of May. The rooms were opened for the reception of the company at eight o'clock, and continued crowded throughout the whole evening. Judging from the numbers who attended, and the large proportion of scientific visitors, a favourable inference may be drawn with reference to the position of the Society in public estimation.

It has been a subject of remark for several months past, that scientific meetings and soirées have been barely supplied with objects of interest, most things worth exhibiting having been sent to the great exhibition, but, notwithstanding the difficulty resulting from this cause, the rooms were sufficiently, although not profusely, supplied with specimens and apparatus calculated to form topics for discussion among those present.

Foucault's pendulum experiment, for demonstrating the rotation of the earth, was exhibited and illustrated in several ways, and appeared to excite much interest. The pendulum was suspended in the well of the staircase, from a height of about forty feet, and the variation in the plane of vibration became very sensible in the course of a few minutes.

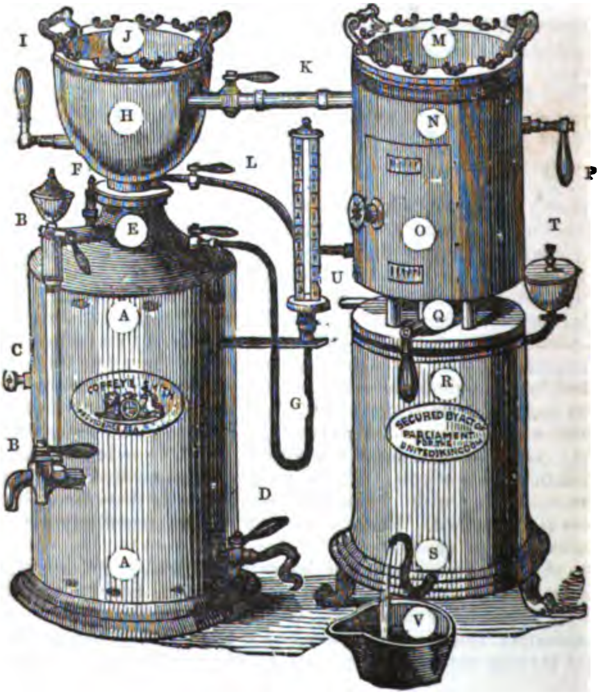
The experiments recently described by Faraday, for proving the magnetic property of oxygen, were shown with the large magnet, and the more striking effects of the magnetic force were illustrated by Mr. Squire, jun., with a very excellent electro-magnet, made by himself.

Among the objects which attracted much notice, were Mr. Meinig's *Hydro-electric Portable Chain Batteries*, a very convenient apparatus for applying galvanic electricity physiologically. Each battery, as the name indicates, is made in the form of a chain, composed of two metals, insulated from contact with each other. A pair of these chains present, when folded up, within the compass of about fifteen cubic inches (the size of an ordinary pocket-book) the whole metallic combination of 120 galvanic elements, ready for instantaneous use, without any previous fastening or other arrangement, requiring only to be immersed for a moment into vinegar or any other diluted acid. Batteries of different sizes are made, so as to adapt them either for giving shocks of considerable intensity, or for producing slight and almost insensible effects. The latter are recommended to be worn by persons suffering with rheumatism or other affections for which electricity is prescribed. Their form renders them peculiarly convenient for this mode of application.

On the tables were some specimens of artificial ivory, and imitation marbles and stones, manufactured by Messrs. Staight and Co., of Charles Street, Hatton Garden, which were much admired. Also, a collection of fossil woods, principally from Antigua, consisting of about seventy specimens, cut and polished, and some of them very beautifully representing the vegetable structure. These were kindly lent for the occasion, by R. H. Solly, Esq.

Apparatus and specimens had been contributed by Mr. Button, Mr. Griffin, Messrs. Horner, Messrs. Davy, McMurdo and Co., Mr. Tennant, Mr. Morson, Mr. Green of Lambeth, Mr. Phillips, Messrs. Knight and Sons, Mr. C. Cracknell, Mr. Parker, Mr. Hanbury, Mr. Squire, Messrs. Watkins and Hill, Mr. Darker, and the Gutta Percha Company. There was also a considerable display of Daguerreotype portraits of medical and scientific men, from the gallery of Mr. Mayall of the Strand; and an engraving, recently published, from a daguerreotype by Mr. Mayall, containing the portraits of Brande, Graham, Grove, and Miller, which was presented to the Society by Mr. Mayall. Some fine groups of crystals, of prussiate of potash and alum, were also received as donations for the Museum of the Society, from Mr. King, of Hurlet; a specimen of kreatine, from Dr. Gregory, of Edinburgh, and some sugar-cane, yams, and bamboo, from Mr. Nobrega, of Madeira.

In conclusion, we must not omit to mention, among objects peculiarly pharmaceutical, the *Esculapian Still and Condensing Apparatus* of Messrs. Coffey and Smith, of 4, Providence Row, Finsbury Square, which was in operation throughout the evening, and appeared to elicit commendation from many who inspected it, and from some who stated that they had practically tried it. We referred to this apparatus on a former occasion, two years ago, but as it has been greatly improved since that time, we subjoin a representation of it in its present form.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SECURED BY ACT OF PARLIAMENT FOR THE UNITED KINGDOM
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V

A A Gas-furnace, with air-tube, wire gauze, pumice-stone, &c., inside.
B B Discharge-cock from boiler, water guage and cup for feeding boiler.
C Handle of furnace-door.
D Gas-cock and flexible tube.
E Neck of boiler.
F Safety-valve and whistle.
G Steam guage and thermometer.
H Cup-shaped head and jacket.
I Regulating lever connected to valve in jacket.
J Moveable pan.
K Main steam pipe
L Condensed steam pipe.
M Moveable pan over drying closet.
N O Drying closet, door, and ventilators.
P Regulating lever same as I.
Q Spent steam-cock connected to condenser.
R Vessel containing cold water and condenser.
S Outlet for distilled water.
T Funnel and cover for filling condensing tub.
U Outlet for waste water from condensing tub.
V Distilled water.

Mode of Operation.—Steam being generated in the boiler by gas or other fuel, ascends through the neck (E) into the head (H), containing the jacket inside, so constructed that by turning the handle (I) you admit or shut off steam from an orifice, in direct contact with any vessel placed therein, a moveable pan (J) block-tin still retort, &c., can be operated upon with precision, as you can regulate your temperature by increasing or decreasing the jet of steam. To the right of H, near the top, is a main steam-pipe (K) which conducts steam to a circular chamber, the top being precisely the same as H I J (opposite), two-thirds of the bottom being devoted to the steam drying-closet (N O) with a cock below (Q), which admits spent steam into the condenser, contained in the circular vessel underneath (R), which is filled with cold water (by T), and ultimately comes out (through S) as condensed steam, or distilled water. If required, one or two more worms can be added to connect to the block-tin still, &c., &c.

TENTH ANNIVERSARY
OF
THE PHARMACEUTICAL SOCIETY,

Held at 17, *Bloomsbury Square, Tuesday, May* 20, 1851.

Mr. William Inch, President, in the Chair.

The President commenced the proceedings of the Meeting with the following

ADDRESS:

Gentlemen,

I appear before you as the representative of the Council, elected by yourselves to carry on the affairs of the Pharmaceutical Society of Great Britain. You did me the honour last year of returning me one of your Council, which by lot will extend to another year. Your Council proposing me as their President, I reluctantly accepted it—that reluctance arising from a sense of my own inability to do the office justice, my health not being so firm as I could wish; however, I am now here as you see to render an account of our stewardship. I have but little to say by way of preliminary observations to the Report which will be read to you, and which it will be your duty to scan and criticise. We are very desirous that you should know all our affairs: we desire to withhold no information—and most gladly shall we listen to any remarks which may have reference to the future prosperity of the Society. Before I go to the subject of the Report allow me to offer some general observations on Pharmacy and its progress. It does not fall to my lot to introduce to your notice any new remedies of importance which the genius of Pharmaceutists has presented to Medical Science during the past year.

Some of those previously in use, however, have acquired increased reputation, while others seem destined for a less favourable result. You have cod liver oil now in large consumption, employing considerable capital—equally beneficial to the diseased, and profitable to the dispenser. Strychine, in its various forms, is extensively employed in medicine; and, I am informed, is now used in astonishing quantities in the destruction of fur-bearing animals, the skins being less injured by this process of destroying life than some others. Chloroform increases in reputation. Cotyledon and kousso, I fear, will not stand the test of experience. The extravagant price of the latter reminds one of the recommendation of the medical man to his patient to go to Madeira—or take horse exercise—when in fact the patient had not the means to buy his daily bread. The compounds of valerianic acid are interesting, and no doubt some of them will be found to be valuable remedial agents. The salts of iron, with citric acid, ammonia, and quinine, have a continued demand.

As to our influence, we may mention the Sale of Arsenic Bill, now before the legislature, the enactments of which will not very much interfere with us. It is denuded, we think of all mischief by the exertions of the previous examination which had been given to the subject by our Committee.

I have to notice the issue of two new Pharmacopœias since our last Anniversary—the one from Dublin, and the other from the Royal College of Physicians of London, to whose high privileges we most submissively bow. These Pharmacopœias are great improvements upon their predecessors—they show much advancement in a right direction; but it is deeply to be regretted that the London College, whom we are called upon to follow, should not have called to their assistance a few well-known Chemists and Druggists, whose long experience and extensive knowledge in Practical Pharmacy would have guaranteed them from some of the errors and inconsistencies which are so palpable in their last production. In this department it cannot be doubted that men, whose every-day employment is the compounding of medicine and the improvement of Pharmacy, have vastly the advantage over professional men whose time is almost exclusively occupied in the investigation of disease.

I am glad that translators and commentators of Pharmacopœias are appearing from our own body. One of our former Presidents announces a work on the subject, and our esteemed and valuable Professor of Pharmacy another. I am sorry to know that Mr. R. Phillips, for many years past the able translator and annotator of the London Pharmacopœia, is no longer amongst the living—he died last week, the day before the formal opening of the Museum of Practical Geology, of which he was the distinguished scientific Secretary or Curator. You are aware he was originally a Chemist in the Poultry. The glaring errors of the new Pharmacopœia of that day called forth from his pen a very able and acute critique on that work, in a pamphlet entitled, *Some Observations on certain Preparations of the New London Pharmacopœia*. I believe the remarks were so generally correct as to acquire for him great praise, and entitle him to rank as an able Chemist. The College had to surrender at discretion, and ultimately chose him as their adviser.

It has given me great pleasure also to find many of our Members diligently employed in duties connected with the benefit of the country, especially in the sanitary movements now so loudly demanded. I must mention the names of Mr. Liddell, of Hull, formerly a London Chemist, and Mr. Dakin, of London, formerly one of your Council.

And now will you allow me to travel back to the Pharmaceutical Society. The sittings of Council, I can assure you, have been well attended. With one exception we have had a full board of generally twenty members. Our labours have not been slight—many have been the discussions; and, although we have not been agreed upon some subjects (for uniformity would be dreadfully dull) yet we have always thought it right to carry out the principles of the majority in their full integrity. I need not disguise that which I have reason to believe is well known to some of you at least, that I have not unfrequently been in the minority. I may be forgiven if, for this once, I tell you that I have watched carefully the interests of this Society from its commencement. I had no selfish motive to join with it. I think if I had to draw a balance it would be against me, except your favour. We sprang up into existence under the influence of threatened wrong and oppression, speedily became a powerfully united body, and then trammelled ourselves with a charter before we were quite certain what were our requirements. Under these circumstances it is not to be wondered at that every thing was not altogether so representative as we could desire. I could have wished the election of Council to have been in the whole body of Members: the power to vote, in London personally only; five miles from London by post. This, I think, would have made us more united. One-third of the Council should have remained by rotation, not by lot. The Secretary, and probably the Professor, should have been the choice of the whole body.

I have some settled opinions with reference to the Society, and you must bear with my stating them this once. One point to which I allude is that on which many of the Members, in conjunction with others, memorialized the Council, having reference to the Transactions of the Society and the Journal, in which they are distributed at the cost and charge of our funds. Another is the Secretarial department. I am thoroughly persuaded in my own mind that no learned society or body can take rank or station, or influence, or increase in numbers, except it has a Secretary devoted entirely to its service, who, from education and scientific knowledge, is equal to take the lead in every department and to be always available. The business of accounts, taking minutes, keeping books, carrying on ordinary correspondence, is very good and proper, and is very well done by your present Secretary, who, I trust will not misunderstand me in these observations, which do not detract from his services. The next notion I have is, that we are fettered in our house. It was a mistake to be here without out-door premises for laboratory purposes, for we are seriously crippled for want of space to extend our operations. Already our Museum has outgrown the room devoted to it, and the Secretary has ceased to have residence in the house.

The last opinion I shall mention is that with reference to our legal standing. We have made no real advance yet:—have our efforts been in the right direction? The Chemist and Druggist of the present day originated really fifty or sixty years ago, not much earlier. A few Apothecaries, disliking to have the annoyance of being roused from their beds and boards, contrived to draw all their practice to their own little shops, and in course of time they became the retailers of physic without visiting the patients; by degrees the public began to approve of the plan, and the retailer also improved the quality of his physic, having more employment for it; moreover, enlightenment with reference to the nature and quality of drugs opened the way to the public attempting to doctor themselves. In process of time they required the experience of the dealer of physic to be added to the physic itself. It soon appeared desirable to take the superior medical man's advice upon paper, and thus, to a great extent, the status of the intermediate visiting Apothecary was altered. The public, always alive to their own interests, saw it worked well—in fact, it was a step towards free trade. Many rushed into the new-created order, and now the Chemist and Druggist is expected to be always ready with his choice stock of effective drugs, and able to prepare with great accuracy the prescriptions and recipes of the medical advisers, who no longer supply the medicines. From the Chemist and Druggist is also expected, in minor cases of disease, that relief which it is believed he can, without danger, give. An immense amount of good is thus effected, and much bodily suffering spared; and although it may be true that in some cases a more accurate knowledge would have deterred him from interfering, yet the trifling mischief thus effected is so completely counterbalanced by the enormous benefit conferred, that any attempt to cripple the Chemist and Druggist would crowd the Houses of Parliament with petitions in his favour. Hence legislative interference can only go in one direction, that of requiring qualification from those who call themselves Chemists and Druggists.

The Report will tell its own tale. The Finance Report will, I think, appear in a more business-like form than formerly. We have destroyed all the terms of "Old Fund," &c. On examining the grounds on which these distinctions rested we found them unnecessary. The Benevolent Fund is sacredly kept for the purposes intended;—it has hitherto borne no part of the expense of management.

The new Council will, probably, also consider whether it will not be advisable, on the Laboratory account, first to charge the expenses and then remunerate the Professor. I deeply regret the cause of that part which will be read to you with reference to the Lecture department. I had expected better things. We have thought of throwing the Lectures entirely open. If I could transport myself back to former times, what would I have given for these opportunities—but I forbear.

In conclusion, I hope here we shall be all harmonious. After the Report will be the election of Members of Council; let those be elected who you think have the Society's interest at heart. Any observations I have made are not subjects for discussion, the Report alone is the official part of this meeting. I have made these remarks only by your courtesy.

I had it in my mind to say something on the subject of underselling one another—how thoroughly degrading it is, and, on the whole, how unprofitable to any of us! I have seen during the year evidence of it, which has pained me. The world is wide enough for the whole of us. Let us cultivate good feeling one for another, not only here but at our own homes.

The Secretary then read

THE REPORT OF THE COUNCIL:

FINANCIAL REPORT.—RECEIPTS AND EXPENDITURE,

From January 1st to December 31st, 1850.

Dr.

	£	s.	d.	£	s.	d.
Balance in Treasurer's Hands, January 1st				147	18	6
Life Members' Fund						
Subscriptions	52	10	0			
Interest	20	18	0			
				73	8	0
Benevolent Fund						
Subscriptions	88	5	6			
Interest	123	14	4			
				211	19	10
Government Securities, Interest				127	9	8
Donation, Sir A. Crichton				2	0	0
301 Town Members' Subscriptions				474	1	6
1196 Country Members				1255	16	0
9 Entrance Fees				18	18	0
458 Associates				240	9	0
6 Examination Fines				6	6	0
349 Registered Apprentices				183	4	6
Registration Fees				25	0	0
Arrears of Subscriptions				71	18	6
Lecture Fees				52	10	0
Laboratory—Balance of Session 1849-50	60	15	4			
Laboratory—Fees, Half-Session, 50-51	316	1	0			
				376	16	4
Balance				123	19	7
				£3391	15	5

Cr.

	£	s.	d.	£	s.	d.
Life Members' Fund Investment				8	7	2
Benevolent Fund,						
Investment	514	8	9			
Gratuities	40	0	0			
				554	8	9
Postage				31	14	5
Advertisements				9	17	6
Stationery				13	13	0
Printing				14	8	6
Fixtures and Fittings				11	7	3
House Expenses				55	14	1
Sundries, and Tin Cases for Diploma				20	18	0
Subscription to the Great Exhibition				21	0	0
Travelling Expenses of Country Members				81	15	3
Board of Examiners				16	16	0
Commission				41	9	3
Salaries				305	0	0
Wages				135	5	0
Library				14	11	10
Museum				0	18	6
Journals				615	0	0
Delivering ditto 30,000				151	4	0
Lectures				530	8	0
Laboratory Expenses	255	5	6			
Professor, Half-Session, 50-51	158	0	6			
				413	6	0
Rent, Rates, and Taxes				404	2	11
				£3391	15	5

We, the undersigned Auditors, have examined the Accounts of the Pharmaceutical Society, and find them correct, agreeably with the foregoing Statement; and that there was standing in the names of the Trustees of the Society, at the Bank of England, on the 31st of December, 1850,

		£	s.	d.
On Account of the General Fund	3¼ per Cents. Reduced	3000	0	0
	New 3¼ per Cents.	1036	7	1
Benevolent Fund	3 per Cent. Consols.	4200	3	10
Life Members' Fund	ditto	726	11	0

Henry B. Cocksedge.
William H. Buckley.
March 24th, 1851. Isaiah Bourdas.

THE SCHOOL OF PHARMACY.

The voluntary system has now been fully and fairly tested in the School of Pharmacy. The plan projected at the time the Society was formed has been carried out in all its details, and the appliances for practical instruction, the Lectures, the Museum, and the Library, including access to a botanical garden, have been regulated and arranged with especial reference to the requirements of the Pharmaceutical Chemist. Young men have been invited and urged to embrace these opportunities of improvement on terms so moderate, as to impose no obstacle; and the hours of instruction have been adapted as much as possible to the convenience of those for whom the School is designed. Advantage has been taken of the experience acquired in other educational establishments on the continent as well as in this country, and every effort has been used to induce the rising generation voluntarily to adopt a course of education calculated at the same time to promote their own future welfare, and to raise the character of the body to which they belong. The success of the experiment has been sufficient to justify the Council in the belief that the institution is well adapted for the purpose in view, although the number of pupils is so small, as to be a source of much disappointment.

The only part of the School which has met with due encouragement, is the Laboratory, which is well attended, every place having been occupied during nearly the whole of the past session, and the proficiency of the students, evinced at their examinations, affords satisfactory proof of the value of the instruction, and the industry of those who have availed themselves of it. The Lecture-Room has not been so well attended, and the Council have again to express regret that this important means of education is not appreciated. The number of pupils in the several classes continues to be quite disproportionate with what might have been expected to be the demand, and what is known to be the value of the instruction afforded.

In a financial point of view, the Report respecting the School of Pharmacy, is not encouraging, as the expenditure considerably exceeds the income derived from the fees for attendance. The annexed tabular statement shows the items of receipts and expenditure for the Laboratory during the past six years, from which it will be seen that there is a deficiency during that period, of £604 12*s.* 4*d.*, without allowing for rent, and interest on capital invested in the Laboratory.

LABORATORY RECEIPTS AND EXPENDITURE FOR SIX SESSIONS,

From 1*st of October*, 1844, *to* 31*st July*, 1850.

Years.	Session.	Pupils.	Fees Received.			Professor's Fee.			Wages.			Drugs. Chemicals, Apparatus, &c.			Gas.			Coal and Coke.			Total Expenditure.		
			£	*s.*	*d.*	*£*	*s.*	*d.*	*£*	*s.*	*d.*	*£*	*s.*	*d.*	*£*	*s.*	*d.*	*£*	*s.*	*d.*	*£*	*s.*	*d.*
44—45	1	10	327	12	0	163	16	0	9	16	0	178	5	8	22	18	3	15	7	6	390	3	5
45—46	2	27	403	4	0	201	12	0	61	4	0	211	5	6	40	0	0	10	2	0	524	3	6
46—47	3	27	445	4	0	222	12	0	109	18	0	241	7	10	56	10	6	12	11	6	542	19	10
47—48	4	27	469	16	0	234	18	0	71	14	0	195	11	0	38	1	6	2	4	0	642	8	6
48—49	5	31	502	19	6	251	9	6	74	4	0	204	11	7	25	10	0	9	8	0	565	3	1
49—50	6	28	529	14	0	264	17	0	73	6	0	237	0	0	27	10	0	15	10	6	618	3	6
		150	2678	9	6	1339	4	6	400	2	0	1268	1	7	210	10	3	65	3	6	3283	1	10

	£	*s.*	*d.*		£	*s.*	*d.*
To Cash, 150 Pupils' Fees ...	2678	9	6	By Expenditure Six Sessions	3283	1	10
To Balance	604	12	4				
	3283	1	10				

The average deficiency of £100 per annum during the first six years of an establishment, novel in character, and supported by voluntary means, would not have been a source of discouragement; but this relates only to one branch of the School, and to that which was expected not only to support itself, but to contribute an overplus towards the expenses of the Lecture department.

The lecture account shows a much larger deficiency, arising from the low scale of fees, and the very small attendance. The loss on this account amounts to upwards of £400 per annum.

It should be stated, however, that since the establishment of the School, 183 Candidates have passed the major and minor examinations, and 656 Apprentices have been registered as future Candidates.

Notwithstanding the heavy expenditure which the School of Pharmacy entails upon the Society, the Council are not prepared to recommend any material curtailment of the educational arrangements, but it will be for the new Council to consider whether any modification could be adopted in the Lectures for promoting economy, without impairing the efficiency of the School. They do not view this as a financial question, but consider that the character, influence, and future prospects of the Society, are mainly dependent upon the means adopted for advancing the art and science of Pharmacy, and raising the qualifications of the Pharmaceutical Chemists of this country. Experience has shown that establishments of this description cannot, even under the most favourable auspices, realize a pecuniary return, or even defray their current expenses out of the fees received from the students. The most flourishing colleges, unless liberally endowed, could not be maintained, and the medical schools are fostered by the artificial stimulus of legislation, which makes the attendance of pupils compulsory.

Such institutions on the continent of Europe are generally established and maintained by the Government of the country. In Great Britain they are dependent either on the voluntary liberality of the public or on the combined support of the promoters of scientific education and the recipients of its advantages.

THE PHARMACEUTICAL MEETINGS.

A satisfactory improvement has taken place in these meetings. The attendance during the past session has been much more numerous, and the supply of scientific communications has been such as to keep up a lively interest in the proceedings. The Council have lately adopted the practice of commencing each meeting by reading the minutes of the preceding one, which affords an opportunity of reopening a discussion on any subject previously brought forward. This plan, although usual in most scientific societies, was not introduced when the Pharmaceutical Meetings originated, and its adoption has had a good effect.

THE LIBRARY AND MUSEUM.

The additions to the Library during the past year have not been numerous. A few donations to the Museum have been received; and the collection of the Society is further increased by the addition of a portion of the Museum of Dr. Pereira, lately removed from the London Hospital. Among the specimens (646 in number) thus transferred to the Society, there are many to which much interest is attached, on account of their history, and the circumstances under which they were collected by a professor unrivalled as an authority in Materia Medica.

THE GREAT EXHIBITION.

The efforts of the British Chemists in support of this national undertaking, afford a satisfactory indication of practical skill and commercial enterprize. Among the exhibitors the Council are glad to observe the names of several who were lately pupils in the School of Pharmacy, and whose productions reflect credit on the Society.

THE BENEVOLENT FUND.

Although this fund has not yet come into extensive operation, several cases have occurred in which it has been instrumental in affording relief, which the Council have reason to believe was well bestowed and duly appreciated. In every instance, the misfortunes for the mitigation of which relief was required, have been unforeseen and unavoidable, the candidates having contributed to the fund for several years, under the belief that they were performing an act of charity to others, which eventually was reflected back upon themselves. A portion of the income of the current year has been added to the capital.

CONCLUDING REMARKS.

On taking a review of the history of the Society from its formation up to the present time, and comparing the previous position of the Pharmaceutical Chemists of this country with that which they have now acquired, the Council feel assured that an important advance has been made, creditable to the promoters of the movement, and beneficial to the public.

Although the sanguine hopes of some of the founders, in regard to the sanction of the Legislature, have not yet been realized, the influence of the Society has been extended and its character has been raised, by the successful efforts which have been made to promote Pharmaceutical advancement, and establish a system of education. The Council may congratulate the Members on the comparative freedom they have lately enjoyed from those attacks and hostilities which were prevalent in former years, and which in fact were instrumental in calling the Society into existence, by demonstrating the necessity of union for self-defence. The maintenance of a representative body ready to act promptly in case of any emergency arising in which the general interests are concerned, is in itself of no small importance. But the chief weight and influence enjoyed by the Society arises from the fact, that qualification has now become the basis of Membership; and that during each succeeding year the ranks are reinforced with Pharmaceutical Chemists, who have gone through a regular course of study, and substantiated their claims to the confidence of the public by passing an examination. It cannot be doubted that this professional improvement would have been more rapid and more general, if the measures adopted for its promotion had been under the sanction of the legislature, but the maintenance of such an institution by voluntary means, at considerable expense, during a period of ten years, is a circumstance reflecting more credit on the zeal and sincerity of its supporters, than could have been conferred by even a wider field of success under the compulsory provisions of an Act of Parliament.

Mr. John Burridge (of Gravesend) in rising to move the first resolution, observed, that having been a pupil in the school of Pharmacy, and having, therefore, had the opportunity of attending the Lectures and Meetings of the Society, he had much pleasure in bearing testimony to the advantages he had enjoyed, and in offering a few remarks in favour of the Society to which he felt so much indebted. In answer to those who occasionally inquire What has the society done ?—what is the use of belonging to it ?—he would reply, It has raised the character of young men, furnished the means of instruction, brought the Members of the trade together, defended their interests, asserted and maintained their independence. Some objected to the Society because it had not regulated the hours of business, the closing of shops on Sunday, the prices of drugs, and other matters of that description. Such interference, however, with the private arrangements of individuals would have been highly improper, and could have produced no result except discord among the parties concerned. Some Members in the country doubted the utility of the Society to them, because they lived beyond the reach of the lectures and meetings. If all our ancestors had argued thus, where would have been our great national institutions ? Even the Great Exhibition had not been without enemies, but in spite of opposition, it had triumphed, and stood in Hyde Park, a monument of human industry, and the progressive character of great principles. He hoped a similar triumph awaited the founders of the Pharmaceutical Society, and that they would live to see it sanctioned by the legislature, and education placed on a firm basis. He moved "That the Report now read be adopted, and printed in the Transactions of the Society."

Mr. Ralph Stamper seconded the Resolution.

Mr. Dickinson observed, that no one regretted more than he did the existence of dissatisfaction in the Society and the state of the balance-sheet. It was well known that he was one of those who had criticised some of the proceedings and advocated certain reforms. But he thought the dissatisfaction was not so much real as imaginary, and that if the Members would attend the Meetings, take part in the business, examine the accounts, and investigate any subject on which they felt any doubts, they would find that there was less cause for complaint than they had previously imagined. He had exerted himself in overcoming the prejudices of some Members, and he believed that the chief source of dissatisfaction consisted in the fact that no progress had been made in gaining for the Society the sanction of the Legislature; but he felt convinced that this desirable object could only be attained by union among the Members and perseverance in their exertions. With reference to the balance-sheet contained in the Report, there were some items on which he (Mr.D.) could not give an opinion without further investigation ; but there was one item which he thought large, namely, £151 4s. for the delivery of the Journals, and he wished to know whether the Journal was sent carriage-free to all the Country Members ?

The Secretary explained that the parcels were forwarded as directed by the Local Secretaries, and that the item referred to the expenses in London, enclosing, directing, and delivering the Journals to Town Members, and the parcels for the country, including booking and porterage.

Mr. Hooper said, that as a member of the Finance Committee he had examined the accounts, and doubted whether retrenchment could be effected.

Mr. **Humpage** suggested a change in the form of the Journal, to admit of its transmission by post.

Mr. **Edwards** (of Liverpool) said, the Members in his locality complained that they seldom received their Journals till the third or fourth of the month, while persons not members received it on the first or second, through their booksellers. He objected to a stale periodical, considering that the chief interest of a Journal subsides in a few days.

Mr. **Francis** (of Woodbridge) said, he received his Journal on the first or second of each month, as he arranged for its enclosure with other goods in a regular monthly parcel.

A **Member** observed, that he made a similar arrangement with his bookseller.

Mr. **Farmar** (of Lambeth), and Mr. **Southall** (of Birmingham), thought the subject should be referred to the Council.

Mr. **Brown** regretted that a desultory discussion on a trivial subject had diverted the Meeting from its proper business, namely, the Report of the Council and the consideration of the best means of obtaining an Act of Parliament, which important object of the Society had been delayed from year to year until the Members naturally felt much discouragement. If money were required for obtaining an Act, he would propose that a subscription be immediately opened for that purpose, and he should be glad to subscribe £10 if other Members would come forward with spirit, so as to ensure a successful result.

Mr. **Dickinson** said he should be glad to second such a resolution.

Mr. **Jacob Bell** observed, that it was not the want of money which delayed the passing of an act, but the want of influence in Parliament. No efforts had been wanting on the part of the Council to bring the subject continually before the Secretary of State, the Lord Advocate, and others connected with the Legislature, with a view of getting a bill introduced into Parliament. Memorials had been presented, deputations had argued the case, the House of Commons had been inundated with petitions, each Annual Report of the Council had contained an account of the proceedings and of the several obstacles as they had occurred. The Members were aware that the differences in the medical profession had been urged as a reason for delaying the Pharmaceutical reform question, that the Government were afraid to face the subject, fearing that it might lead to a labyrinth of difficulty, as had been the case with the Medical Bills. This was, however, a delusion, and he (Mr. Bell) hoped that some advance would shortly be made. Recent arrangements in the medical profession had led to a belief that the long-existing differences were in process of adjustment, but whether this should prove to be the case or not he could see no real obstacle to the passing of a Pharmaceutical Bill, if the Government could be induced to entertain it. A petition to Parliament, emanating from that Meeting, might assist in drawing attention to the subject; and a form of petition was ready in case the Members should think proper to adopt it, at the close of the other business of the day.

The **Chairman** observed, that the motion before the Meeting must first be disposed of. He therefore put the first Resolution, which was carried unanimously.

Mr. **Edwards** (of Liverpool) moved "That the Council be requested to consider the practicability of delivering the Journal to all the Members of the Society, free of charge, on the date of publication."

Mr. **Farmar** seconded the resolution, which was carried.

Mr. **Dickinson** moved, and Mr. **Wyman** seconded a vote of thanks to the Council, which was passed, and acknowledged by Mr. Waugh, Vice-President.

Mr. **Waugh** regretted that his avocations prevented his continuing to discharge the pleasant though arduous duties of the Council. He could inform those Members who had not yet served, that the duties were arduous; that it was difficult to satisfy all parties. In retiring from office he was induced to look back at early times, and to hope that the spirit which had prevailed at the period when his labours had commenced, would continue to animate the Members of the Society—he alluded to that spirit of harmony and goodwill which had been so well exemplified by William Allen and Charles James Payne, the first President and Vice-President. He felt persuaded, that if the successors of these good men would follow their example, the result could not fail to prosper. New Members started with a great advantage. Formerly it was considered a ridiculous chimerical project to attempt to bring the Chemists together for the purpose of scientific improvement. Experience had now shown the advantage of this union, and future members of Council would have the benefit of the experience of their predecessors, and might avoid their errors, and improve upon what they had succeeded in accomplishing.

Mr. **Thomas Herring** regretted the retirement of Mr. Waugh from the Council. He thought much good had been done by the Society; and the Conversazione on the previous evening had been an indication of its prosperity, and the widely spread interest it had awakened. He also looked back with pleasure at another important event in the history of the Society—the dinner at which upwards of £800 had been collected for the Benevolent Fund; and he looked forward to another opportunity of meeting for this praiseworthy object.

Mr. **Shawcross** (of Stockport) spoke in favour of the Benevolent Fund. He thought the names of those who receive relief from this fund should not transpire, as the dread of such publicity might deter some of the most deserving Members from becoming candidates.

It was then moved by Mr. **Daniel B. Hanbury**, of London, seconded by Mr. **Joseph Gifford**, of London, and

Resolved, "That the following Petition be adopted and signed by this Meeting, and be presented to the House of Commons, by Mr. **Jacob Bell**[*]:—

"The humble Petition of the undersigned Members of the Pharmaceutical Society of Great Britain,

"Sheweth,

"That in almost all civilized countries, those persons who prepare prescriptions and sell medicines, are regularly educated in chemistry and other branches of knowledge, and pass an examination.

"That in Great Britain no such provision is required by law, consequently uneducated and unqualified persons may, and frequently do, perform these responsible duties, by which means your Petitioners have good grounds for believing that the public sustain injury.

"That the Pharmaceutical Society was established in 1841 for the purpose of providing a remedy for this evil, by the introduction of a regular system of pharmaceutical education and an examination.

"That the arrangements adopted for this purpose have been attended with as much success as could be expected from such efforts on the part of a voluntary society; and your Petitioners are persuaded from their experience, that the sanction of the Legislature is necessary in order to ensure the accomplishment of that reform which the safety of the public requires.

"Your Petitioners, therefore, humbly pray that your honourable House will be pleased to pass an Act for regulating the Qualifications of Pharmaceutical Chemists."

The President announced that the next business of the meeting would be the election of the new Council and Auditors.

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[*] The petition, signed by fifty-six Members, was presented the same afternoon.

The following Members were appointed by the Meeting as Scrutineers, viz. J. B. Edwards, R. A. Farmar, J. L. Moor, and J. Wyman. Upon their Report being received, the Chairman proclaimed

THE COUNCIL.

(by lot.)

Bird, William Lionel, 42, Castle Street, Oxford Street.
Davenport, John T., 33, Great Russell Street, Russell Square.
Edwards, George, Spital Street, *Dartford.*
Evans, Edward, 52, Hanover Street, *Liverpool.*
Ince, William, 31, Southampton Street, Strand.
Pigeon, Jun. Richard H., 31, Throgmorton Street.
Watts, John, 107, Edgware Road.

(by election.)

Bastick, William, 2, Brook Street
Bell, Jacob, 338, Oxford Street.
Deane, Henry, High Street, *Clapham.*
Dickinson, William, 16, Cambridge Street, Hyde Park.
Garden, Felix R., 372, Oxford Street.
Gifford, Joseph, 104, Strand.
Hanbury, Daniel B., Plough Court.
Hemingway, Walter, 20, Portman Street.
Herring, Thomas, 40, Aldersgate Street.
Horner, James T., 20, Bucklersbury.
Lea, John W., 68, Broad Street, *Worcester.*
Lescher, Joseph S., 60, Bartholomew Close.
Southall, William, 17, Bull Street, *Birmingham.*
Squire, Peter, 277, Oxford Street.

AUDITORS.

Gunton, Walter G. B., New Weston Street, Southwark.
Humpage, Benjamin, 51, Judd Street.
Kent, Thomas, 226, Blackfriars' Road.
M'Culloch, Charles, Covent Garden.
Reynolds, George, 271, Bethal Green Road.

A vote of thanks to the Chairman having been passed, the Meeting separated.

LIVERPOOL CHEMISTS' ASSOCIATION.

Royal Institution, Colquitt Street, April, 25, 1851.

THE PRESIDENT IN THE CHAIR.

Dr. Nevins reviewed the New London Pharmacopœia: he concurred with the compilers of this edition in the avoidance of unnecessary changes in the names of preparations, enumerated the omissions and introductions of formulæ, and regretted the number of unimportant changes made in the preparations, and also that the process of percolation had not been introduced for the preparation of tinctures. He then considered in detail the several changes that had been made.

Mr. Abraham enumerated several preparations which have been extensively introduced into practice, which he regretted were not introduced into the Pharmacopœia.

The President found additional grounds in the present for urging the importance and necessity for a national Pharmacopœia.

A paper on the Action of Hard Water upon Lead, by Mr. Spencer, had been announced, but in consequence of that gentleman's absence from town the paper was postponed.

A few remarks were made on the evidence quoted in the *Lancet* of February 22, by Drs. Brett and Nevins.

Mr. Abraham read a copy of the Sale of Arsenic Bill in its amended form. The restrictions were generally approved by the members, with the exception of that which obliges the retail dealer to purchase not less than 10lbs. from the wholesale Druggist. This was considered much too large a stock for the majority of retailers, especially in large towns, whose consumption of the article would not justify a larger quantity than 2 or 4 lbs.; in fact, any restriction on the retail Chemist was thought unnecessary.

The discussions on the action of water on lead have since called forth the following series of experiments on the subject:—

ACTION OF HARD WATER ON LEAD.

BY J. B. NEVINS, ESQ., M.D.

Sheet lead and common lead piping were exposed to the action of water containing the following solutions, with the results now to be described. In every case the lead remained in the water for a week:

Description of Experiments.—In the first set of experiments, sheet and pipe-lead was exposed to the action of a strong solution of sulphate of magnesia (gr. 4, and also gr. 10 to the ounce) in distilled water.

2d set.—The same solutions of sulphate of magnesia, combined with bicarbonate of soda (gr. 4 in the ounce).

3d set.—Carbonate of magnesia, partially redissolved by carbonic acid in distilled water.

4th set.—Carbonate of lime, partially redissolved by carbonic acid gas in the same way.

5th set.—Solution of common salt (gr. ½ in the ounce) in distilled water, and the same strength in the common spring water of Liverpool, which contains a moderate quantity of sulphate of lime.

6th set.—Solutions of common salt as above, only stronger (gr. 2 in the ounce).

7th set.—Solutions of common salt (gr. ½ and gr. 2 in the ounce) in combination with gr. 1 and gr. 4 of sulphate of magnesia respectively (*i. e.* gr. ½ with gr. 1. and gr. 2 with gr. 4).

8th set.—The same experiment, only substituting chloride of calcium for chloride of sodium.

Object of the Experiments.—It will be seen on examining the above experiments, that nearly every point in dispute was brought under investigation; viz., the action of *hard* water, which does not contain sulphates, in experiments 3 and 4; the action of *strong* solutions of sulphates in experiment 1; the modifying effect of the presence of excess of carbonic acid along with the sulphates in experiment 2; the effect of chlorides of various strength in distilled water, and in water containing small and large amounts of sulphates, of both lime and magnesia, in experiments 5, 6, and 7, the difference in the effect of chlorides of equal strength, dependent upon difference in the base with which the chlorine is combined; and, lastly, the difference in the effect produced upon sheet lead and common pipe lead.

Results. Different kinds of lead.—The difference between the effect upon the sheet and the pipe-lead was so slight in every case, as scarcely to merit notice. If anything, the pipe lead was the least affected, as shown by the visible effect of sulphuretted hydrogen for quantitative analysis was not resorted to in any instance. When, however, tea-lead was operated upon, the difference was very great; which corresponds with results I obtained many years since, in which I found that whilst the deposit from pure lead in a certain time weighed 5.5 grains, that from an equal surface of tea-lead placed under precisely similar circumstances, weighed 11.5 grains.

This result might almost be anticipated, as impurity in common pipe-lead is more likely to be zinc than any other metal, and this would retard rather than hasten the action of the water upon the lead, by forming a galvanic arrangement; whilst the tin, which is stated to be present in the tea-lead, would hasten the action upon the lead, as it is less easily acted upon by chemical agents than lead itself. The difference in effect of the different strengths of the same solution, was by no means strongly marked the result being so nearly the same at the end of the week's trial, that it is unnecessary to make any distinction in speaking of them, between the solution of four grains of sulphate of magnesia and that of ten grains; between the half grain and the two grains solution of chloride of calcium, &c.

Sulphates.—The solution of sulphate of magnesia produced a very decided effect. The bottom of the jar in which the experiment was made, became covered with a thick white layer, and a coating similar in appearance covered the surface of the lead, but was removed without difficulty by gentle scraping with the nail. On transmitting sulphuretted hydrogen, the white sediment became black powder, and the water assumed a brown hue. Thus it was clear that the strong solution of the sulphate did not form a protecting layer upon the lead, though repeated experiments year by year, shown to my class of chemical students, have confirmed beyond dispute, that the Liverpool water, which contains a small quantity of sulphate of lime, does protect it. It appears to me that the difference in the effect of a strong and a weak solution of a sulphate, is owing to the rapidity with which the precipitate is formed by the first, which prevents its adhering firmly; while, in the second, it is formed so slowly, that its adhesion is uniform and perfect.

Carbonates.—All the carbonates acted upon the lead so far as to cause the water to become decidedly coloured by the sulphuretted hydrogen, and a dark-coloured deposit was formed amongst the superfluous carbonate of lime and magnesia. The effect from the bicarbonate of soda was the most decided, and this notwithstanding the presence of a small quantity of sulphate of lime in the common spring water, and of a large quantity of sulphate of magnesia in the distilled water, whence it is evident that neither a large nor a small quantity of a sulphate acts as a protection, in the presence of a soluble carbonate.

Chlorides.—In every case the water became brown on the transmission of the sulphuretted hydrogen, but the solution of chloride of calcium was far the most affected, and a decided coating was formed upon the lead in it, which was not the case in any of the solutions of common salt, in which the lead retained its ordinary appearance, and no precipitate was formed upon the bottom of the jars. The effect of the chlorides was therefore less marked than that of the other solutions employed.

Conclusions.—From the above experiments, it is clear that *hard* waters do not protect lead, simply from the fact of their being hard; but that the protection, when effected, is dependent not only upon the nature of the salt causing the hardness, but also upon the proportion present, for whilst all experience proves that a small amount of a sulphate, at any rate of sulphate of lime, does protect the lead, a large quantity of sulphate of magnesia acted considerably upon it. It appears also to be proved, that chlorides act upon lead, whether with or without the presence of a sulphate, but that their action is not so great as that of soluble carbonates, which produce a rapidly injurious effect upon the metal. At the same time, these results do not practically affect the question of the safety of using lead for common waters, so far as sulphates, at any rate, are concerned, inasmuch as the solutions here employed, were out of all proportion stronger than any ordinary spring-water, and the experience of years has proved that there are no bad consequences practically occasioned by the employment of the metal for water containing sulphates.

ORIGINAL AND EXTRACTED ARTICLES.

REMARKS ON CALYSACCION LONGIFOLIUM, WIGHT.

[*With Figure*].

BY HUGH CLEGHORN, M.D.,
Madras Medical Establishment.

It is remarkable that there is no published figure of this very beautiful tree, which is found in considerable abundance along the top of the Malabar Ghauts in the Southern Mahratta country, West Mysore and Coorg. I have seen it, with other Guttiferæ (Garciniæ, Mesuæ, and other genera) adorning the high mountains above Mangalore, which receive the full force of the western monsoon, and enjoy a very humid atmosphere.

It is singular that the illustrious Van Rheede should not have introduced this plant into his *Hortus Malabaricus;* and the omission can only be accounted for from the deciduous nature of the inflorescence, which probably dropped off before his native artist had time to sketch a figure.

The accompanying drawing was taken in 1846, when I was employed in the Mysore commission, and made many excursions in these parts, which may be called Rheede's country. The drawing, with the specimen delineated, was identified by Dr. Wight in the following year. The name *Soorgee*, by which the tree is known, was noted at the time. The flowers, which are yellowish and deciduous, are very fragrant, and are produced in clusters below the leaves. I have seen the fallen flowers collected when dry and sold in the bazaars, for the sake of their fragrance, under the name *Soohgee-hoo.* This corresponds with the Malabar name *Surgiha*, in Roxburgh's *Hortus Beng.;* and with *Suriga*, which Buchanan gave as the specific name—Calophyllum Suriga; and also approaches Suringee, one of the names in Graham's Catalogue.

The name *Nag-kassar*, under which the flower buds were imported, is applied to at least two species of Mesua, and refers to the divine serpent *Naga.* Little dependence is to be placed on such names, the plants receiving them often having no other than a general affinity, such as producing showy and odorous flowers. The flowers of several species of Mesua are exposed for sale in the same manner as the buds of the Calysaccion. I may observe that the species of Mesua were involved in much obscurity till Dr. Wight elucidated the genus (*Illus.* i., p. 127). The original *M. ferrea* is from Ceylon, and has white fragrant flowers; Rheede's iii., t. 53, is *M. speciosa*, DC., and only from Malabar; *M. ferrea* Rox. is now *M. Roxburghii* of Wight, a Bengal plant; *M. ferrea*, W. and A. Prod., is now *M. Coromandelina*, from Courtallum; while *M. ferrea*, Choisy, and perhaps of Blume and Rumph., vii. t. 2, is from Eastern Asia.

CALYSACCION LONGIFOLIUM, *Wight.*

ALIMENTARY PREPARATIONS OF GLUTEN.

BY the usual method of preparing wheat-starch, the gluten, a most valuable and important article of food, is got rid of chiefly by allowing it to putrify, and in part by solution in the acetic acid developed by fermentation. Some years since, however, M. Em. Martin, of Vervins, proposed to extract the starch without injuring the gluten, which then becomes available for alimentary purposes. His process is a mechanical one (resembling that long practised in laboratories for procuring gluten) and consists in washing wheat flour, made into a paste with water, either by the hand or by machinery.

The gluten thus obtained is susceptible of numerous useful applications for alimentary purposes. Mixed with wheat flour, in the proportions of thirty parts of flour, ten of fresh gluten, and seven of water, it has been employed to produce a superior sort of macaroni, vermicelli, and other kinds of Italian pastes; and MM. Véron frères, of Paris, have made with it a new sort of paste, which they have termed *granulated gluten* (*gluten granulé*).

Mr. J. P. Gentile, of the Habertonford works, near Totness, in Devonshire, has been for some time past engaged in the manufacture of gluten for alimentary purposes, and has placed in the Exhibition samples of several dietetical substances made with gluten; such as *macaroni*, *vermicelli*, a sort of *gluten chocolate*, and a kind of *meat biscuit powder*. (See *Official Catalogue*, Class 3, No. 108.)

Madame St. Etienne, the wife of Mr. Gentile's foreman, has also placed in the Exhibition a very complete collection of alimentary preparations made with gluten. (See *Official Catalogue*, Class 3, No. 138.)

To the same category belongs Mr. Bullock's *Semola* (see *Official Catalogue*, Class 2, No. 76) of which he has given an account in the *Lancet*, of December 15, 1849, and March 9, 1850. It is in fact wheat-gluten made into a paste with wheat flour and granulated.

In all the above preparations, the gluten employed is that extracted from wheat by a mechanical process (hand-working) as practised by M. Em. Martin.

Messrs. Orlando Jones and Co., manufacturers of rice-starch, have also placed in the Exhibition a specimen of *rice gluten*. (See *Official Catalogue*, Class 3, No. 128). But, as it is extracted from rice by a solution of caustic soda, and precipitated from its alkaline solution by an acid, it is obvious that it must have suffered deterioration, and be less proper for alimentary purposes than gluten extracted from the grain by a mechanical process.

We hail with much satisfaction these attempts to introduce into use, as alimentary substances, preparations of gluten. No one has hitherto succeeded in making in England macaroni and vermicelli equal to the Italian pastes; for, although the English-made article presented a tolerably good appearance, it failed in cooking, either running into a mass or falling to pieces; whereas it should simply expand and retain its form even after long boiling. With Mr. Gentile's gluten it is to be hoped that good pastes may be made even with English wheat. Hitherto hundreds of tons of a most valuable and important article of food have been annually lost, and the prevention of this by the economic application of the gluten deserves, therefore, every encouragement.

By mixing gluten with wheat-flour Mr. Gentile prepares what he calls *gluten flour*, containing forty-two per cent., or four times the normal quantity of gluten. This preparation is susceptible of several very useful applications. It yields a very nutritious and digestible *gluten biscuit;* mixed with cocoa it forms an agreeable and nutritious *gluten chocolate;* and mixed with beef or mutton it furnishes a highly-condensed nutritive food. Bread made with gluten flour might be advantageously employed by diabetic patients as a substitute for Bouchardat's *gluten bread.* J. P.

EAST INDIAN ISINGLASS.

The source of East Indian isinglass has not hitherto been satisfactorily made out. Dr. Pereira, in his *Elements of Materia Medica*, says, that this isinglass is "probably the produce of a species of *Polynemus.*" In the East Indian collection in the Exhibition, is a dried specimen of *Polynemus plebeius*, which is stated to be the fish from which the East Indian isinglass is obtained.

ON SOME PREPARATIONS IN THE NEW LONDON PHARMACOPŒIA.

BY MR. JOHN HORNCASTLE.

In looking through the new London Pharmacopœia, I have remarked several formulæ which have not yet received such a notice in the Pharmaceutical Journal as they seem to require. Few persons will be at the trouble of studying the new Pharmacopœia minutely, and many will, doubtless, trust to the reviews and criticisms that appear in your periodical for information as to its contents. It is, therefore, important that this information should be as complete as possible, and that the numerous trivial, though by no means useless changes, which might otherwise pass unnoticed or be misunderstood, should be particularly pointed out and explained. On this account I am sure you will excuse my presumption in requesting your attention to a few instances that appear to have escaped your observation.

In the formula for dilute phosphoric acid there is a slight alteration which will make a difference of about $\frac{1}{20}$ in the strength; the new preparation being stronger than the old in the proportion of 28 to $26\frac{2}{3}$. But it is the note which more especially demands a notice. It contains two or three important mistakes. The specific gravity, notwithstanding the alteration in strength, is stated to be the same as that of the acid of the old Pharmacopœia, and the saturating power has by some mischance been incorrectly given. A fluid ounce would require 192 grains of crystallized carbonate of soda, instead of 132 for saturation. I think some caution is necessary in reference to the mode of applying the chloride of barium and nitrate of silver tests. In the hands of experienced Chemists they will always yield results that may be depended upon, but from my own experiments I am doubtful whether this will be the case with the inexperienced. I have found that dilute phosphoric acid, which I believe to be quite pure, gives a precipitate when these tests are in great excess; so that it is necessary to observe that they should not be added in large quantity.

The directions for preparing dilute sulphuric acid demand a few words. When correctly followed, the product will be as nearly as possible identical with the preparation of the last Pharmacopœia, differing, in fact, by little more than the amount of condensation which takes place in the process of dilution, a variation occasioned by the anxiety of the College to prepare exactly a pint. But the manner in which the formula is expressed will frequently cause a much greater variation; for, who will be likely to read the instructions through? Most Chemists and Druggists would have confidence in their ability to make such a simple preparation, and having ascertained that fifteen fluid drachms of sulphuric acid and a pint of distilled water are to be taken, they would mix these quantities, without seeking further directions. The diminution of strength that will arise from this cause is not likely to produce any inconvenience, but it will be well for us to take caution, and make it a rule to read the entire instructions in every case, and likewise to assure ourselves as to the strength of every constituent of a preparation, otherwise, as in the case of dilute nitric acid, which you noticed in your review last month, we may commit serious errors. The specific gravity of strong sulphuric acid in the new Pharmacopœia (1.843) is rather lower than in the old (1.845).

The change in empl. opii. has not been pointed out. It is now directed to be made with extract instead of powdered opium, and more than three times its former strength. Permit me to correct an error in estimating the strength of extr. sarsæ liquidum, in comparison with "concentrated fluid extract, sixteen times the strength of decoction." The former will be only $\frac{1}{30}$ stronger than the latter instead of $\frac{1}{6}$, as stated in the last number of the Pharmaceutical Journal.

In the formula for nitrate of bismuth, no allowance has been made for the diminution in strength of nitric acid. This is an error that will at once be rectified by the manufacturer; but I fear it will not fare so well with another mistake I have to mention. The addition of a pint of distilled water has been made to the formula in the old Pharmacopœia for tinctura ferri ammonio-chloridi, without a proportionate increase in the quantity of ammonio-chloride. This change was noticed in your review as if it were an intentional one; but a perusal of the note will show that the tincture is intended to be the same strength as formerly. The note, which has evidently been copied from a remark in Mr. Phillips's translation of the last Pharmacopœia, states that "a fluid ounce, on the addition of potash, gives a precipitate of 5.8 grains of sesquioxide of iron." Now, as 100 grains of ammonio-chloride of iron yield only seven grains of sesquioxide, it is clear that forty-eight grains (the proportion to the fluid ounce of tincture, according to the new formula) could not give 5.8 grains. Supposing the quantity of ammonio-chloride to be doubled, the amount of precipitate would be too small, but a deficiency is more easily accounted for than an excess.

Mr. Bastick bestows a commendation upon the formula for syrupus ferri iodidi, in which I cannot altogether concur. The iodide of iron being so readily decomposed on exposure to the air, I cannot see the propriety of evaporating about half the water and again returning the greater part towards the end of the process. The strength is objectionable: it differs from the syrup recommended by Dr. Thomson, which I believe is in common use in this country; and it likewise differs from the Dublin syrup, so that unless Physicians state which they intend, it will sometimes be a question whether we shall use Dr. Thomson's, containing three grains of iodide in the fluid drachm; the London, containing 4.88 grains; or the Dublin, containing 5.73 grains. Another objection to the strength may be alleged on account of the want of simplicity in the proportions. Dr. Thomson's form has a decided superiority over the others in this respect.

I will here conclude my remarks, as you have not yet reviewed the whole of the Pharmacopœia, and if I were to continue I should only be anticipating your own labours.

Birmingham, *May* 19, 1851.

PIL. COLOCYNTH. COMP., P.L., 1851.

BY MR. JOHN BLAND.

I BEG to offer a few remarks on the above preparation (intended to replace the Ext. Coloc. Comp., P.L., 1836) and to point out some reasons why this valuable and popular purgative is subject to so much variation in its sensible properties and its strength. This is to be attributed partly to vagueness in the authorised formula, partly to the difference in quality and condition of the component drugs as found in commerce, and partly to the inclination of a certain class of druggists to substitute a cheaper and less troublesome form for that of the London College. The process just introduced, though perhaps inferior in some respects to that formerly enjoined, is to be regarded as a concession to the interest and convenience of the pharmaceutist whose business is not extensive, inasmuch as it enables him to prepare for himself at a moderate cost, without endangering his fire insurance or subjecting him to the claws of the exciseman, a genuine and efficient preparation. There are, however, some defects in the formula for Pil. Colocynth. Comp., which I would venture to indicate. In the first place, as regards the Ext. Colocynthidis, I found in a recent experiment with 6oz. of the pulp freed from the seeds, that the quantity of water prescribed (13¾ fl. oz.) was insufficient. After maceration, the expressed fluid measured 12¼ fl. oz., which readily passed through filtering paper, and was evaporated at a temperature of about 120°.

As soon as the infusion was heated, it became turbid, and continued to deposit a resinous looking matter, which amounted, when the evaporation was finished, to about six drams, and could not, while warm, be incorporated with the extract soluble in water; but when the whole had cooled, it became friable, and was then mixed, though not without difficulty, in a Wedgewood mortar: the whole weighed about 14 drams, is a light coloured, intensely bitter, and not perfectly homogeneous extract. The next ingredient ordered, is Ext. Aloes *Contriti*; if we turn to the head "Extracta," we find no special directions as to the consistence of Ext. Aloes, so that it comes under the general direction that extracts are to be evaporated to a pill consistence. It is clear that the College intended to prescribe Ext. Aloes in the more convenient form of a dry pulverisable extract, as it is usually kept for dispensing. There is another point of uncertainty in the form for Ext. Aloes. It is not clearly stated whether the solution of Aloes after the necessary digestion for three days is to be allowed to cool, or maintained at "a gentle heat" until the dregs are deposited; if the former, the product of extract will be much smaller, but soluble in cold water, and a more active purgative than that from a solution which has been kept hot. I believe that the more expensive preparation is intended, and have as little doubt that it is seldom or never used. With regard to the scammony, Dr. Pereira has shown conclusively that virgin scammony alone ought to be employed; but the drug sales at Garraway's prove that others are not yet converted to his views. Sapo mollis, which literally corresponds with the College definition, "Sapo ex olivæ oleo et potassâ confectus" is not to be found in commerce, nor have I seen such an article, except a small sample which I once prepared by way of experiment; commercial white soft soap I believe always contains tallow (stated to be necessary to give it a proper consistence) and sometimes a considerable excess of alkali; it has also occasionally a rancid smell, which renders it unfit for internal use.

Penton Street, May 17.

OBSERVATIONS ON COPAIBA.

BY MR. WILLIAM PROCTER, JUN.

COPAIBA as a drug, under the name of Balsam of Copaiva, has been known and written about for more than two hundred years, and its valuable remedial powers have attracted and received the deliberate attention of Physicians, Pharmaceutists, and Chemists, for many years past.

The genus Copaifera is an extensive one; its species, though occurring most largely in the forests of Northern and Eastern Brazil, are found in those of Guiana, Venezuela, and in some of the West India islands. As yet no writer has described accurately the botanical sources of the several kinds of copaiba found in commerce, nor have travellers satisfactorily ascertained whether each of these is invariably the product of a single species of copaifera, or whether they are sometimes the mixed products of several species growing together in the region of collection. "According to Hayne, the species from which most of the copaiba of commerce is derived is the C. multijuga, growing in the province of Parà." (U. S. Disp.) But the C. Martii of Hayne, and perhaps other species, grow in that neighbourhood, and may contribute to the Parà balsam. The copaiba derived from the vicinity of Rio Janeiro is attributed to C. Langsdorffii and C. coriacea, but the sources of the Angostura, Maracaibo, and West Indian drugs are quite uncertain, although attributed to C. officinalis. It is to be regretted that so accurate an observer as Dr. Weddell, did not investigate the copaiferas whilst a sojourner in South America.

The extensive demand for copaiba has caused it to be sought in various localities, and from numerous species; and it is probable that climate, and the modes of extraction and preservation, taken in connexion with its variable botanical origin, may be referred to as the most prominent and active causes of the remarkable variations in the sensible properties and chemical constitution of the drug itself. It is with a view of throwing some additional light on this subject that the writer has hazarded an opinion in relation to the collection of some specimens of the drug, found in commerce of late years, which he has not as yet been able to verify or disprove by information obtained from their geographical sources, but which is based on observations made on the effects of age and exposure on copaiba, and its volatile oil.

In approaching the subject, it will be viewed, 1st., in reference to the proximate constituents of copaiba; 2nd., the proportional relation of these in the copaibas of commerce; 3d., the causes existing and acting, before and after the juice is extracted, which modify the quantitative relation of its constituents. And, lastly, conclusions.

1st. The proximate constituents of copaiba, from whatever source, are volatile oil and resin, with a minute portion of some soluble organic acid (probably the acetic or succinic) and in some instances fatty matter.

The *volatile oil of copaiba* is constituted much like that of turpentine. Its equivalent is $C_{10} H_8$, which makes it isomeric with the oil of lemons, and just one-half of that of oil of turpentine. It forms a crystalline artificial camphor with hydrochloric acid gas, which differs from those of the oils of turpentine and lemons. Its specific gravity is .878; it boils at 473° F., but undergoes a slight alteration, unless oxygen is excluded; it is very soluble in anhydrous alcohol, but much less so in that of officinal strength (.835). It is the cause of the peculiar penetrating odour of copaiba, and has a biting extremely disagreeable persistent taste. Durand first ascertained it to be a hydro-carbon, by noticing its indifference towards potassium, which keeps well in it. It is gradually resinified by exposure to the air.

The resinous portion of copaiba consists of two distinct substances; one of these is a strong resinous acid to which the name of *copaivic acid* has been given. The other is neutral, incapable of uniting with bases, has a permanently soft consistence, is soluble in anhydrous alcohol and ether, and insoluble in weak alcohol, and mineral naphtha.

Copaivic acid is inodorous, nearly insipid, soluble in ether, alcohol, and the volatile oils, and its alcoholic solution reddens litmus paper. It forms combinations with bases which are generally soluble in ether and alcohol. It has the same ultimate composition as colophony, the resin of European turpentine, $C_{40}\ H_{32}\ O_4$. It is usually amorphous like ordinary resin, but Schweitzer has obtained it in colourless crystals. Its salt of magnesia is the basis of the officinal copaiba pills.

2d. Let us now examine the proportional relations of these constituents as they occur in the copaibas of commerce.

According to the analysis of Stoltze, copaiba contains 38. of volatile oil, 52.75 copaivic acid, 1.66 soft resin, 7.59 water and loss.

Gerber's analysis of fresh copaiba gives .41 volatile oil, 51.38 copaivic acid, 2.18 soft resin, 5.44 water and loss.

Gerber's analysis of old copaiba gives 31.7 volatile oil, 53.68 copaivic acid, 11.15 soft resin, 4.1 water and loss.

Durand found 50 of volatile oil and 50 of resin, including a little fatty matter, acetic acid and perhaps water, without isolating the copaivic acid.

According to Guibourt, copaiba yields 45 volatile oil, and the resinous residue consists of 98 parts of copaivic acid, and two parts soft resin.

Mr. Whipple (Pereira) obtained 48 per cent. of resin, and 52 per cent. of volatile oil.

In addition to the above, I have examined five specimens of copaiba obtained at different times in the Philadelphia market, and also a sample of oil of copaiba which had been kept long in a bottle imperfectly stopped, until it became slightly resinous, and more viscid than copaiba itself. As a means of distinguishing them, I will attach the letters of the alphabet. The method adopted to ascertain the amount of oil and resin, was to place a weighed quantity, say 100 grains, of the specimen, in a small weighed capsule, and expose it to a regular heat at about 250° F., until the oil was evaporated, and it ceased to lose weight. The capsule was then weighed, and the loss ascertained. Although this method of analysis is not so accurate as distillation with water, using a larger quantity, and weighing the distilled oil and the residue resin separately, yet it is sufficiently precise to answer the object of the writer.

(*a*.) This specimen was remarkable for being very slightly resinous. Its specific gravity was only .916; its odour purely that of copaiba; it was light straw coloured, very fluid, and consisted of 80 parts of volatile oil, and 20 parts of resin. The latter was soft, adhered to the fingers, and was slightly acid to litmus when dissolved in alcohol. The origin of this specimen is uncertain, but it is believed to be from Parà. Sixty grains of it was heated several minutes with one sixteenth of recently calcined magnesia, and set aside twenty-four hours. No combination ensued; the magnesia settled to the bottom, the copaiba remaining transparent above it.

(*b*.) Origin unknown, consistence rather thin, odour good, colour brownish yellow, and sp. grav. .956. It consisted of 65 parts volatile oil, and 35 of resin ; when heated with one-sixteenth of magnesia and set aside 24 hours, only partial union followed, a part of the magnesia precipitated, and a part was taken up by the oleo-resin, which remained turbid.

(*c*) This specimen has a thick consistence, its sp. grav. .983, is several years old, but its origin is not known, although it looks like that from Angostura. It consists of 50 parts of volatile oil, and 50 parts of resin. The resin is pulverizable, and quite acid to litmus when dissolved in alcohol. Heated with one-sixteenth of magnesia, it became tolerably consistent on cooling, but did not acquire a pillular consistence after thirty-six hours.

(*d.*) This sample, obtained as Angostura copaiba, has a density of .985, is transparent, has a light brown colour, correct odour, and thick consistence. It consisted of 35 parts of oil and 65 of resin. The resin was not fragile and pulverizable, but soft and sticky between the fingers. Heated with one-sixteenth of magnesia, it acquired on cooling a thick consistence, and at the expiration of 36 hours its consistence was firmer than that of *c*. The resin was quite acid to litmus.

(*e.*) This specimen has been in my possession several years, it was obtained as "solidifiable balsam," but its origin is unknown. Its colour dark yellowish brown, consistence thicker, its odour more aromatic than either of the preceding, and its density .986. It consisted of 34 parts volatile oil and 66 parts of resin, the alcoholic solution of which was strongly acid to litmus paper. When heated with one-sixteenth of magnesia, its consistence was almost pillular on cooling, and after 24 hours was fit for use.

(*f.*) This specimen was oil of copaiba obtained by distillation, that had been kept five years in a cracked bottle, so as to admit the air. Its consistence is thicker than either of the preceding copaibas, has a bright amber colour, is perfectly transparent, readily soluble in commercial alcohol, and its solution hardly reddens litmus paper. It consists of volatile oil 66, soft resin 34.

When mixed with one-sixteenth of magnesia and allowed to stand five days, no combination ensued; it was then heated, with no increase of solidity, except what might be attributed to loss of oil; in other words, though thick and resinous, it is not solidifiable, because it contains no copaivic acid.

The following table exhibits these results at one view:—

	Stoltze.	Gerber's fresh Copaiba.	Gerber's old Copaiba.	Durand.	Guibourt.	Wipple.	*a*	*b*	*c*	*d*	*e*	*f*
Volatile oil............	38.	41.	31.7	50	45.	48	80	65	50	35	34	66
Copaivic acid	52.75	51.38	53.68	50	53.9	52	20	35	50	65	66	
Soft resin	1.66	2.18	11.15		1.1							34
Water and loss......	7.59	5.44	4.10									

By a comparison of these results, we are first struck with the great variation in the proportion of volatile oil, which varies from 31 to 80 per cent. Second, In the three first and the fifth analyses, the ratio of copaivic acid is nearly equal, while the soft resin varies from 1.66 to 11.15 per cent., being greatest in the oldest. Third, That only three specimens containing from 50 to 60 per cent. of resin will solidify. Fourth, That the resin in the specimen *a* differs from all the rest both in colour, consistence, and want of acidity, the copaiba being apparently immature; and, lastly, That in the spontaneous oxidation of copaiba and its volatile oil, it is the soft resin only that is formed.

3d. The causes modifying the proximate constitution of copaiba, existing and acting before and after the extraction of the juice, are several.

It is an ascertained fact that the ascending juices of plants, particularly of trees, are much more simple than those which descend, after having passed the circulation of the leaves; and the principles deposited by the downward current contain more carbon and less oxygen than those contained in the ascending current. This arises from the chemical changes going on in the leaves during the action of light on them, by which oxygen is evolved from the carbonic acid and other constituents of the juices. "Their green leaves absorb the chemical rays of the sun so completely as to give no image in the daguerreotype." (*Graham.*) This deoxidizing and carbon-depositing action appears to go on to a much greater extent in olieferous and resineferous plants than in others.

Now it appears from observations made by different observers, that as the copaiba trees get older, their juices become more oleo-resinous, that is to say, the process of oxidation to which the volatile oil is subjected, causes it to become more resinous, year after year, and it is only after a certain age that, in the opinion of the copaiba collectors, the trees are fit to be tapped. The analysis of Rose proves that copaivic acid is the oxide of the oil of copaiba; thus the formula of the acid is $C_{40}\ H_{32}\ O_4$ whilst that of the oil is $C_{10}\ H_8$, which quadrupled $= C_{40}\ H_{32}$, and this plus $O_4 =$ the formula of the acid.

Again; as the juices of the older trees are more resinous, the juices of the younger trees are more oily and less resinous, and beyond doubt there is a period in their growth when the volatile oil is associated with comparatively little resin. Now the writer is willing to hazard the opinion that the specimen of copaiba, distinguished by (*a*) in the table, was extracted at this period of the growth of the tree, when not only the oil was in great excess, but the resin not completely elaborated; in other words, not converted into copaivic acid. This view is indirectly corroborated by the fact that there are one or two oleo-resins, containing but a trifle of resin, which are obtained by tapping, from trees growing in Venezuela. One of these, called " native oil of laurel or sassafras," obtained from trees growing on the banks of the Orinoko, about 400 miles from its mouth, is now under examination, and will be noticed in the next number.

The judgments of the medicinal value of copaiba, have generally been based on its consistence and solidifying property. The observations of writers on therapeutics have shown that nearly all its peculiar efficacy is due to the volatile oil. If this is true, and there appears no reason to doubt it, the " solidifiable balsam" is the least valuable as a medicine, and it becomes an important question whether the practice of extracting the juice from the older trees is the most eligible? It is for therapeutists to ascertain whether such copaiba as (*a*) is or is not better than such as (*e*.)

It is apparent from the analyses above detailed, that copaivic acid is a *natural* product formed in the juice of the plant, and not after its extraction, by exposure to the air. The examination of old copaiba by Gerber, and of the specimen (*f*) of old oil of copaiba by the writer, especially show this; hence, if any given specimens of the drug be not naturally possessed of about 50 per cent. of copaivic acid, no subsequent oxidation will render it solidifiable.

The soft resin formed by oxidation of the oil appears to give more consistence to the drug weight for weight, than the copaivic acid, probably from being less soluble, and hence old copaiba is not only thicker in consistence from loss of volatile oil, by evaporation, but from the formation of the soft resin. It is highly probable that specimens of copaiba may be met with, which, originally immature, and slightly resinous, have become thick and resinous from exposure. Such copaiba will not solidify for the causes mentioned. The remarks by Joseph Laidley at page 121 of this volume tend to corroborate some of the statements in this paper, whilst these explain the difficulties met with by that writer.—*American Journal of Pharmacy.*

ON THE MANUFACTURE OF COMMERCIAL ALUM (*Ammonia Alum*) AMMONIACAL SALTS, AND THE CARBONATES OF SODA AND POTASH.

MR. SPENCE, of Manchester, has recently patented some improvements in the manufacture of alum, ammoniacal salts, and the carbonates of soda and potash, a condensed account of which processes we subjoin:—

The alum shale or shist, is the material whence the alumina is obtained; this shale is roasted in heaps in the open air, in order to render it porous and more absorbent of the sulphuric acid. To the roasted shale, sulphuric acid of sp. grav. 1.75 is added, by which means sulphate of alumina is formed. In order to wash out from the almost dry mass, this sulphate of alumina, and at the same time to supply the equivalent of sulphate of ammonia necessary to constitute the formation of the double salt of alumina and ammonia, the boiling hot mother-liquor of a previous operation is employed, and as this mother-liquor, when removed from the alum crystallizers, contains free sulphuric acid, the ammonia from a still containing the ammoniacal liquor of the gas works is distilled into it, and the boiling-hot solution of sulphate of ammonia thus formed, dissolves out the sulphate of alumina from the shale. The alum liquor thus obtained, is of such a specific gravity, that it crystallizes without the necessity of having recourse to evaporation, and thus a considerable saving in fuel is effected.

In order to obtain ammoniacal salts, such as sulphate and muriate, with the greatest possible economy, a series of two or more, say for instance, four cylindrical boilers are employed, each of which is placed at such a distance above the other, that the contents of the upper boiler may be drawn off into the one next below it. The uppermost boiler is provided with an exit-pipe, and has also a supply-pipe, connecting the boiler with a reservoir of ammoniacal gas liquor. Into the lowermost vessel of the series, passes a pipe conveying high-pressure steam, by means of which, the liquor in this boiler soon becomes heated to the boiling point. The vapour of ammonia and water passes off through an exit pipe into the boiler placed next above it in the series, the liquor in which also quickly boils, and vapour of ammonia and water passes off in the same way as before to the next vessel above it, and so throughout the series. By the time the vapour of ammonia passes off from the uppermost boiler, it has become so concentrated, that on passing it into sulphuric or muriatic acid, a concentrated solution of either of those salts is obtained, of sufficient specific gravity to crystallize without evaporation, and thus a considerable saving in fuel and time is effected, and the ammoniacal liquor most thoroughly exhausted. Fresh supplies of ammoniacal liquor are constantly furnished to the uppermost vessel from the reservoir; the partially exhausted liquors are run from the higher to the lower vessels in succession, and the exhausted liquor run off to waste from time to time, from the lowermost vessel of the series.

With the view of using the sulphates of soda and potash obtained as bye-products in various chemical operations, various means have been employed for their conversion into the carbonates of soda and potash. Amongst other plans which have been proposed, and more than once patented, is that of adding a solution of sulphate of soda or potash to a solution of hydrosulphuret of baryta; sulphate of baryta precipitates, and hydrosulphuret of soda or potash remains in solution. Carbonic acid gas is then added to the solution of the alkaline hydrosulphuret, sulphuretted hydrogen is liberated, and solution of carbonate of soda or potash obtained.

It would however appear, that by the addition of carbonic acid at ordinary temperatures to the solution of the alkaline hydrosulphuret the result is not effective, and the object of the present process, is, therefore, to heat the carbonic acid gas to the temperature of 200° Fahr., previous to passing it into the hydrosulphuret solution. By this means it is stated that the process of decomposition is effectively accomplished. The solution of alkaline carbonates thus obtained, may then be either evaporated to dryness to form ash, or crystallized in the usual manner. The sulphate of baryta obtained may be reconverted into hydrosulphuret of baryta, by heating it with carbonaceous matter in the usual way.

COMPOSITION OF IPECACUANHA ROOT.

BY ERWIN WILLIGK.

THE author has examined the root of *Cephaëlis Ipecacuanha* in Rochleder's laboratory at Prague, and found small quantities of *fat*, traces of a *volatile oil*, *gum*, *starch*, *pectin*, *emetin*, *woody fibre*, and also a *peculiar acid*, erroneously considered by Pelletier as *gallic acid*. The following are the results of this examination :—

Starch and Pectin.—If the triturated root be boiled with water, a brownish gelatinous liquid, having an unpleasant smell, is obtained. If this be strained through coarse linen, to remove the woody fibres, then diluted with a large quantity of water, and filtered through paper, a mucilaginous greyish substance remains on the filter, and by drying, becomes hard, brittle, and blackish-brown. When boiled with water, this substance yields a slightly yellow liquid, in which the presence of starch can easily be proved; if, however, ammonia be added to the boiling water, the liquid becomes dark-coloured, and, upon the addition of diluted muriatic acid, gelatinous flocculi appear in it, which possess all the properties of pectic acid.

Gum and phosphatic salts.—The filtered liquid contains, besides emetin, and a few salts, a considerable quantity of gum. The liquid having been mixed with an aqueous solution of sugar of lead, let fall a brownish precipitate, which consisted, for the most part, of phosphate of lead, and the liquid filtered from this precipitate, yielded, when treated with the tribasic acetate of lead, a second precipitate, which was exhausted with water, and decomposed under water by sulphuretted hydrogen. The liquid filtered from the sulphuret of lead, was then evaporated to half its volume, and mixed with an excess of alcohol of 98 per cent., when a white substance precipitated, and was separated by filtration, washed and dried at 100° Cent.

This substance readily dissolved in water, and yielded, when boiled with diluted muriatic acid, grape sugar; when burnt, an incombustible residue remained behind, amounting to 1.14 per cent. The analysis showed 44.45 per cent. carbon, and 6.31 per cent. hydrogen, which corresponds to $C_{12} H_{10} O_{10}$, the formula of gum. In the alcoholic liquid filtered from the gum, the peculiar acid of ipecacuanha is contained. The liquid filtered from the precipitate produced by the tribasic acetate of lead, yielded, when treated with strong alcohol, a gummate of lead of a white colour, which, being decomposed by sulphuretted hydrogen, filtered from the sulphuret of lead, and evaporated, yielded the largest quantity of gum. In the last mother-liquors, the emetin was contained.

Ipecacuanha acid, $C_{14} H_8 O_6$. The powdered root was boiled with alcohol of 0.840, the filtered liquid treated with tribasic acetate of lead, the precipitate washed with alcohol of 0.830, and dissolved in diluted acetic acid, by which the phosphate of lead remains behind.

The acetic solution was mixed with the tribasic acetate of lead, the precipitate collected on the filter, and the filtered liquid decomposed by a small quantity of ammonia, by which a precipitate was obtained. Both precipitates were separately washed with alcohol of 98 per cent., mixed with ether, decomposed by sulphuretted hydrogen, and filtered from the sulphuret of lead.

The first precipitate gave a light yellow liquid. This was evaporated in the water-bath in a current of dry carbonic acid, till the ether had escaped. The residue was then mixed with water, filtered, in order to remove some fat, and digested with animal charcoal, and the reddish-brown liquid, filtered from the charcoal, and evaporated to dryness in the water-bath, in a current of carbonic acid. The residue, dried at 100° C., is the *hydrate of ipecacuanha acid*. The second precipitate was treated like the first, and the analysis of the acid obtained from it, gave almost the same results

Properties of Ipecacuanha acid.—This acid forms a reddish-brown substance, of a strong bitter taste ; it is highly hygroscopic, soluble in ether, and more so in alcohol and water. The diluted watery solution yields with sugar of lead no precipitate; tribasic acetate of lead produces a brownish-white precipitate, which readily imbibes oxygen from the atmosphere, becoming at the same time darker coloured. It also becomes darker coloured by loss of water, and by drying under exclusion of the oxygen of the air.

A solution of a persalt of iron (chloride of iron) is coloured green, even by a very diluted solution of the pure acid ; ammonia produces a violet colour, by an excess of ammonia the liquid becomes black like ink, and a blackish-brown sediment is formed in it. The salts of silver and mercury are reduced by the acid. The cupreous salts produce no precipitate with the acid, but on the addition of ammonia, a dirty, greenish-brown precipitate is produced. If a solution of the pure acid, mixed with alkalies, be exposed to the atmosphere, a dark, blackish-brown colouration, with absorption of oxygen, is very soon perceptible. This tendency to absorb oxygen, although in slighter degree, belongs to the pure acid, as well as to its salts. When heated, the acid fuses, and evolves a penetrating odour of formic acid, and leaves behind a vesicular coal, which is burnt with difficulty.

It dissolves in concentrated sulphuric acid with a brownish-red colouration, and on the addition of water, grey flocculi are precipitated. Nitric acid dissolves it with a deep reddish-yellow colour ; upon the application of a slight heat, a lively development of gas takes place, the solution simultaneously becoming yellow. Analyses of the two precipitates described above showed that the acid had the following composition :—

Carbon	56.36	56.11	14 =	1050.0	56.37
Hydrogen......	6.23	6.22	9 =	112.5	6.04
Oxygen.	37.41	37.66	7 =	700.0	37.59
				1862.5	

The compounds of this acid, examined by the author, had the composition represented by the following formulæ :—

Hydrate of ipecacuanha acid ......$C_{14} H_8 O_6 + HO$.
First salt of lead ....$C_{14} H_8 O_6 + Pb O + HO$.
Second salt of lead ....$6 (C_{14} H_8 O_6) + 5 Pb O + 4 HO$.
Third salt of lead ....$2 (C_{14} H_8 O_6 + Pb O + HO$.
Fourth salt of lead ....$6 (C_{14} H_8 O_6) + 7 Pb O + 6 HO$

The analyses of the hydrate, and of the various combinations with lead, prove, that the acid contained in the ipecacuanha is not gallic acid, but a peculiar new acid. By these combinations, as well as by some reactions; *e.g* with the persalts of iron, it is shown to be very analogous to caffeo-tannic acid, whose presence in various plants of the family of the Rubiaceæ, gen. Coffeacea, namely, in the seeds of *Coffea arabica*, and in the root of *Chiococca racemosa* has been proved. The difference between the two acids consists only in the proportion of oxygen :

Caffeo-tannic acid .... $= C_{14} H_8 O_7$.
Ipecacuanha acid (anhydrous) $= C_{14} H_8 O_6$.

By the discovery of this acid, the group of those acids which are contained in various plants of the family Rubiaceæ, has been increased by one member :

Catechin, from *Nauclea Gambir* (dried *in vacuo*) $= C_{14} H_6 O_6$,
Kinic acid (in its salt of lead)........................ $= C_{14} H_8 O_8$.
Caffeo-tannic acid (dried at 100°) .... $= C_{14} H_8 O_7$.
Ipecacuanha acid (anhydrous)........................ $= C_{14} H_8 O_6$.

Central Blatt, 1851, No. iv., p. 55.

REMARKS ON THE NOMENCLATURE EMPLOYED IN THE LISTS OF MATERIA MEDICA CONTAINED IN THE NEW LONDON AND DUBLIN PHARMACOPŒIAS.

In the Dublin Pharmacopœia (published by the College, July 5, 1850) we are told that "the names of medicinal plants generally adopted are those given by Dr. Lindley in his *Medical and Œconomical Botany*, (8vo, Lond., 1849), the most recent British work on this subject." By this paragraph, we suppose that it is meant to throw on Dr. Lindley the responsibility of the accuracy or inaccuracy of the names of the medicinal plants contained in the Dublin Pharmacopœia. If so a great injustice has been done to the Doctor; for in several instances the compilers of the Pharmacopœia have erroneously applied the information contained in Dr. Lindley's work; while they have failed to introduce any discoveries made subsequent to the publication of the Doctor's book, but prior to that of the Pharmacopœia.

In the London Pharmacopœia it is merely stated that, unless otherwise indicated, the names of animals cited are those used by Cuvier, and of vegetables those employed by Linnæus or De Candolle.

We select at random a few subjects from the lists of the Colleges, for notice.

1. SAGO.

According to the London College, Sago is the fecula of the stem (*caudicis fæcula*) of "*Sagus lævis* Rumph. *et aliæ fortasse Palmarum species*." The Dublin College, on the other hand, declare it to be "the farina from the interior of the trunk" of the "*Cycas circinalis*; but add that "it is also obtained from other species of *Cycas* and various Palmaceæ."

That a starch or farina is obtainable from several species of Cycas, is an undoubted fact; but the assertion that the sago of commerce is procured from this source is a gross error. A microscopic examination of the farina obtained from the stems of *Cycas circinalis*, and of other species of Cycas cultivated in this country, proves that the starch grains of this genus differ both in shape and size from those of commercial sago.

The sago of commerce is undoubtedly the produce of the stems of palms, especially of *Sagus lævis*, and the statement of the London College is, therefore, correct.

In the East Indian collection contained in the Exhibition are specimens of *sago flour* and *pearl sago* from Singapore, and of sago bread from the Moluccas. The *sago flour* is said to be "manufactured in Singapore. The raw material imported from Borneo, Sumatra, and the neighbouring islands." The same statement is made with respect to the three sizes of white *pearl sago*. Now it is well known that the sago of commerce is imported into England from Singapore; and that in the islands above referred to as supplying the "raw material," the sago trees are palms (*Sagus* and *Saguerus*).

The *sago bread* is in brown cakes of about four inches square. It is said to be from the "Moluccas (Amboyna);" and is accompanied with the following explanation: "The pith of the sago palm prepared for exportation. In this state it forms the principal food of the natives of the Moluccas; especially during their sea voyages. It is cooked by simply dipping the cake in warm water, which softens it. It is also sometimes made into soup."

2. CINCHONA.

The following are the statements of the London and Dublin Colleges with respect to the nomenclature and origin of cinchona bark:

Ph. Lond.

Cinchona flava (*regia*)	Cinchona Calisaya, *Weddell.*
(*Cinchona cordifolia*, Ph. 1836).	*Cortex.*
Cinchona pallida (*de Loxa*).	Cinchona Condaminea, *Weddell.*
(*Cinchona lancifolia*, Ph. 1836).	*Cortex.*
Cinchona rubra.	Cinchonæ species incerta.
(*Cinchona oblongifolia*, Ph. 1836).	*Cortex.*

Ph. Dubl.

Cinchona Condaminea (*Humboldt and Bonpland*). Crown or Loxa bark tree. The bark.

Cinchona flava. Yellow bark. Obtained from an unascertained species of Cinchona.

Cinchona micrantha (*Ruiz and Pavon*). Gray or Huanuco bark tree. The bark.

Cinchona rubra. Red bark. Obtained from an unascertained species of Cinchona.

It has long been well known that the specific names *cordifolia*, *lancifolia*, and *oblongifolia*, as applied to the species of Cinchona respectively, yielding the officinal barks called yellow, pale, and red, are incorrect.

The yellow bark used in the manufacture of disulphate of quina, is called by the Dublin College merely *Cinchona flava*, a name which is also applied on the continent to Carthagena bark. The London College have more correctly adopted the name which J. A. Murray applied to it in 1790, namely *royal yellow bark* (*Cinchona flava regia*), though on the continent, this bark is more usually known as *Cinchona calisaya*. Until the publication of Weddell's *Histoire Naturelle des Quinquinas* in 1849, the botanical origin of this bark was unknown. But this botanist has described and figured the plant which yields it, and to which he has given the name of *Cinchona Calisaya*. The London College have very properly adopted this plant as the source of yellow bark, but the Dublin College, apparently in ignorance of Weddell's work, declares this bark to be "obtained from an unascertained species of Cinchona." Now, as we have before stated, Weddell's work was published in 1849. In the November number of the Pharmaceutical Journal for that year, we noticed his discovery of the tree yielding yellow bark, and in February, 1850, we published a figure of the plant taken from his work. It is extraordinary, therefore, that in July, 1850, the Dublin College should have made the erroneous statement above quoted.

It is deserving the especial attention of pharmaceutists, that in the preparation of "*Decoctum Cinchonæ*," "*Extractum Cinchonæ*," "*Infusum Cinchonæ*," "*Infusum Cinchonæ spissatum*," and "*Tinctura Cinchonæ*," the London College direct *yellow* bark to be employed. But by an oversight (as we suppose) "*Tinctura Cinchonæ Composita*" is directed to be prepared with pale bark.

Pale bark (by which is meant crown or loxa bark) usually known in the shops by the name of "*lancifolia* bark," is properly referred by both the Colleges to *Cinchona Condaminea*. But it will be observed that the London College refer it to Weddell's Cinchona Condaminea, whereas the Dublin College ascribe it to Humboldt and Bonpland's Cinchona Condaminea. Weddell's species includes not only the *C. Condaminea* of H. and B., but also Mutis's *C. lancifolia*, as well as some other varieties previously supposed to be distinct species.

Both the Colleges properly declare the red bark of commerce to be obtained from an unascertained species of Cinchona. It was formerly ascribed to *C. oblongifolia*, but this was an error.

The Dublin College has followed the Edinburgh College in admitting Gray or Huanuco bark (the Lima bark of the French pharmacologists) into the Pharmacopœia, and have referred it to *C. micrantha* of Ruiz and Pavin. This bark yields cinchonine, but is not much found in English commerce.

3. THUS, OR FRANKINCENSE.

The London College declares this resin to be "*Terebinthina e cortice exudata, aëre indurata*" of "*Abies excelsa et Pinus palustris.*"

The Dublin College refer it merely to *Abies excelsa.*

There can be no doubt that the London College has committed a ludicrous mistake in declaring the resinous exudation of Pinus palustris to be "Thus." The fact is, Druggists usually substitute dry American turpentine for thus or frankincense, just as the grocers sell chicory for coffee. But the declaration in the Pharmacopœia, that American turpentine is thus is about as great a blunder as would be the assertion of the Chancellor of the Exchequer, that chicory is coffee.

4. AMYGDALÆ.

In the Pharmaceutical Journal, vol. vi., p. 222, we made some observations on the accidental substitution of bitter for sweet almonds in the preparation of almond emulsion; and observed, that in order to guard against this accident, Jordan almonds should be employed for prescriptions, as, on account of their dissimilarity of shape from bitter almonds, they can be readily distinguished from the latter. The London College has taken the hint, and ordered the Jordan almond (*Amygdala Jordanica*) to be exclusively used.

SAPO MOLLIS.

ALTHOUGH soft soap has been included in the Materia Medica of the London Pharmacopœia since 1836, yet as it was not ordered in any of the formulæ contained in that work, and is but rarely prescribed, it has not hitherto been generally kept, in a state fit for medical use, by pharmaceutical chemists. In the new Pharmacopœia, which has just been issued, soft soap is ordered as a constituent of several of the pill-masses, and it will therefore be necessarily kept in future by every one engaged in dispensing medicines.

The *common soft soap* of commerce is *not* the *sapo mollis* of the Pharmacopœia. The former is an offensive compound made with stinking fish oil or other impure oil, and is wholly unfit for use in medicine; whereas the latter, according to the instructions of the College, is prepared from olive oil and potash, and is perfectly free from any disagreeable odour. It is expressly stated in the new Pharmacopœia that common soft soap, made with fish oil and potash, is not to be substituted for sapo mollis, P.L.

The demand which will immediately arise for this article will ensure a sufficient supply from the wholesale manufacturers, yet to some of our readers a few observations with reference to the process by which it is made may not be unacceptable.

The ingredients employed are olive oil and caustic solution of potash, which are boiled together, continuing to add the alkali until the mixture, which at first has the appearance of an emulsion, becomes gelatinous and perfectly transparent. Excess of alkali beyond that which enters into the composition of the soap is necessary to produce this effect, and, in addition to this free alkali, the gelatinous mass will also contain more than the proper quantity of water, as well as the glycerine, which is one of the products of the process.

The excess of water is driven off by evaporation. In making hard soaps, the free alkali and glycerine are separated by adding common salt to the gelatinous mass first produced, when the soap, being insoluble in the saline solution thus formed, rises to the surface. This process, however, cannot be applied in making soft soap, as the potash of the soap would be replaced by soda, and thus the soft soap converted into hard soap. The separation of the soap may also be effected by concentrating the alkaline liquor itself, as it is found to be insoluble in strong caustic alkali, and this method is applicable to the preparation of potash soap.

In consequence of the difficulty of completely separating the free potash, soft soap is generally strongly alkaline, and this is especially the case when it is made in small quantities.

RETURN OF DRUGS AND MERCHANDIZE IMPORTED, &c.

(Continued from page 526).

	ISINGLASS.			JALAP.			SARSAPARILLA.			SENNA.		
	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.	Imported.	Retained for I ome Consumption.	Exported.	Imported.	Retained for Home Consumption.	Exported.
	cwts.	cwts.	cwts.	lbs.	lbs.	lbs.	lbs.	lbs.	Quantities exported not given in the Official Returns.	lbs.	lbs.	Quantities exported not given in the Official Returns.
1826	1,764	1,629	68	46,550	45,487	8,008	95,762	82,913		126,546	106,352	
1827	1,656	1,554	84	48,384	48,334	10.932	89,785	76,797		118,826	116,244	
1828	1,378	1,489	177	51,498	89,400	12,303	169,518	85,862		219,280	136,060	
1829	1,864	1,424	140	61,600	45,056	18,827	228,164	104,560		187,492	122,800	
1830	1,459	1,400	101	70,560	37,210	11,437	113,880	98,672		258,498	144,432	
1831	1,736	1,583	103	54,992	39,510	3,765	176,854	107,410		250,296	130,222	
1832	1,568	1,670	24	16,800	48,800	3,782	200,042	119,088		523,188	191,707	
1833	1,763	1,650	79	37,632	49,500	3,215	119,144	118,258		499,573	187,733	
1834	1,976	1,689	48	88,111	50,720	5,609	202,328	131,501		488,313	174,020	
1835	1,811	1,814	58	73,908	54,366	8,557	301,535	133,277		143.651	174,561	
1836	1,049	1,735	26	46,875	46,352	8,493	67,002	133,074		497,190	196,082	
1837	1,834	1,735	66	41,211	59,524	3,731	147,551	105,523		301,534	199,666	
1838	1,885	1,720	69	72,462	44,047	10,368	220,379	142,970		438,026	195,858	
1839	1,904	1,644	20	56,424	38,156	28,612	285,586	133,859		222,652	214,214	
1840	1,425	1,589	29	73,553	41,665	24,459	180,126	138,634		225,779	209,588	
1841	1,385	1,494	31	54,001	45,259	30,576	120,581	125,815		151,548	207,595	
1842	1,417	1,609	32	114,107	68,294	19,357	138,949	156,508		241,263	276,132	
1843	1,395	1,444	18	67,587	58,464	8,912	128,078	122,951		552,490	320,788	
1844	2,806	1,800	12	47,548	49,871	22,057	221,487	190,382		281,977	258,660	
1845	1,433	1,656	28	38,113		3,386	378,241			564,179		
1846	1,817	1,739	15	73,199		3,716	222,419			444,820		
1847	1,831	1,665	81	53,178		16.173	138,078			552,905		
1848	1,591	1,872	40	68,829		17,353	103,435			921,785		
1849	1,771	1,672	43	82,519		35,637	118,934			541,143		
1850												

QUANTITIES OF DRUGS ENTERED FOR HOME CONSUMPTION.

The extreme difficulty, and in some cases impossibility, of obtaining the requisite information necessary for the compilation of accurate drug statistics, prevents our extending the tabular account of the quantities of articles imported, exported, and retained for home consumption, to so great an extent as we could have wished. The tables already given have been compiled from official sources, and subjected to the most careful revision. There remain, however, many other drugs, the complete statistics of which it would have been interesting to have given; but as the Customs' returns of the quantities imported, show only the number of packages, and not the weight of each, it becomes impossible from these returns to ascertain with sufficient accuracy for tabular statements, the actual amount of these drugs imported. In addition to this, no account is now kept by the Customs of the quantities of drugs entered for home consumption, the duty on which was repealed in 1845. In order, therefore, to supply some information relative to the most interesting part of these returns, viz., the quantities retained for home consumption, we have compiled a table from the official returns of articles consumed during four years previous to the repeal of the duties, from an inspection of which an approximative estimate may be formed of the average annual home consumption of the drugs therein enumerated.

We also subjoin a table showing the quantities of certain articles entered for home consumption during a period of several years, the duties on which have been reduced, but not repealed. These returns, like those contained in the other table, were compiled from official sources.

Quantities of the undermentioned Drugs (Duty repealed in 1845) entered for Home Consumption

	Year ending Jan. 5, 1839.	Year ending Jan. 5, 1841.	Year ending July 5, 1843.	Year ending July 5, 1844.
Aloes....................lbs.	114,315	145,311	302,553	244,376
Ambergris ....ounces	267	1,738	1,923	1,871
Angelica ....cwts.	447	428	251	289
Aniseeds .... "	348	305	891	396
Annatto .... "	2,605	2,951	4,099	3,680
Argol.................. "	17,464	21,549	15,559	28,319
Balsam, Canada...........lbs.	7,092	6,485	13,455	10,705
—— Capivi..........cwts.	322	1,062	774	984
—— Peru ....lbs.	1,858	1,019	400	1,676
—— Tolu .... "	1,325	1,984	7,768	1,340
Camphor ....cwts.	667	604	736	710
Cardamoms..............lbs.	4,620	6,430	7,369	3,558
Castor .... "	138	428	394	1,149
Chamomiles, Foreign .... "	8,570	35,789	35,531	63,302
Colocynth................ "	15,612	9,397	13,435	11,800
Columbo .... "	20,034	10,959	49,207	14,677
Cream Tartar ....cwts.	12,969	13,728	17,346	22,564
Cubebs ....lbs.	33,347	33,540	82,991	41,493
Galls ....cwts	4,649	4,162	4,614	4,000
Gentian .... "	510	626	922	630
Gum Ammoniacum......lbs.	5,129	12,436	6,013	10,647
—— Benzoin............ "	12,012	7,925		
—— Fœtid.............. "	5,683	7,979	12,022	11,773
—— Gamboge .... "	12,540	9,315	7,697	14,051
—— Guaiacum.......... "	4,174	9,991	11,922	5,759
—— Kino .... "	861	522	1,301	903
Hellebore..............cwts.	288	260	403	86
Ipecacuanha .. . .lbs.	12,662	6,355	10,931	7,835
Juniper Berries........cwts	6,068	10,462	14,002	8,253
Manna ....lbs.	14,268	19,169	9,970	20,531
Moss Lich. Isl. ....cwts.	68	80	111	160
Musk ....ounces	2,295	1,370	3,042	3755
Myrrh ....cwts.	181	119	108	178
Orris Root .... "	183	232	239	183
Saffron ....lbs.	5,500	3,339	5,190	3,259
Sang. Draconis .... "	8,625	4,112	8,443	4,640
Sassafras ....cwts.	252	605	1,097	679
Scammony ....lbs.	8,086	12,010	12,932	10,662
Squills ....cwts.	86	209	287	225

Quantities of the undermentioned Drugs (Duty unrepealed) entered for Home Consumption.

	1838.	1840.	1842.	1843.	1844.	1846.	1847.	1848.
Cantharides ......lbs.	18,431	18,464	23,999	17,067	15,481	14,721		
Ol. Bergamot .... "	12,162	14,035	14,824	17,215	13,949	15,724	17,498	21,778
——Caraway ...... "	1,747	1,347	1,041	309	428	1,349	892	668
——Cassia .... "	4,541	3,095	4,982	1,116	1,268	6,966	4,794	4,586
——Cloves .... "	0	0	462	331	364	889	402	179
——Lavender .... "	4,763	2,445	4,225	7,268	6,275	8,183	8,267	8,742
——Lemon........ "	17,598	24,943	33,748	26,642	30,442	41,662	43,258	50,566
——Mint.......... "	425	319	308	182	331		285	38
——Peppermint .. "	2,527	6,890	6,711	7,003	6,388	13,678	14,523	16,878
——Spike .... "			437	315	290	225	251	108
——Thyme........ "	11,938	8,818	16,968	7,261	11,368	9,830	7,537	7,747
——Unenumerated "			27,576	17'048	21,492	32,402	30,168	28,547
Otto Rose .... "	942	911	987	710	554	880	1,041	637
Quinine Sulph.ounces	101,705	22,468		63,698*	62,172*	38,130		
Tamarinds........lbs.	144,909	126,718				118,581		

The cantharides entered for Home Consumption at the Custom House, London, in the years 1847, 1848, 1849, and 1850, were respectively 14,909, 14,156, 12,370, and 19,474 pounds. About 2,500 pounds of cantharides are annualy imported into Hull.

* Returns marked thus *, are for the years ending July 5, 1843 and 1844.

ROYAL INSTITUTION.—*Weekly Evening Meeting, April* 11.

ON ATMOSPHERIC MAGNETISM.

BY PROFESSOR FARADAY.

On a former evening (January 24), it was shown that oxygen gas was magnetic, being attracted towards the poles of a magnet; and that like other magnetic bodies, it lost and gained in power as its temperature was raised and lowered, and that the change occurred within the range of natural temperatures. These properties it carries into the atmosphere; and the object this evening, was to show how far they might be applied to explain certain of the observed variations of the terrestrial magnetic force.

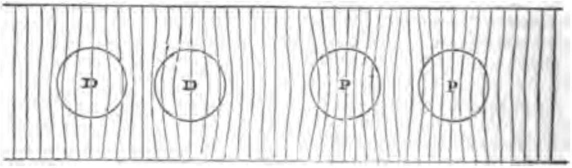
If a source of magnetic power be considered (as a magnet) it presents us with a system having polarity; and if the parts which are called the poles be taken as representing the most concentrated condition of the polarity, then the contrary polarities, manifest externally in relation to the magnet, are perfectly definite, being exactly equal to each other. If the magnet be irregular in the disposition of its force, still the same definite character of the sum of the contrary polarities holds good.

External to the magnet those concentrations which are named *poles* may be considered as connected by what are called magnetic curves, or lines of magnetic force, existing in the space around. These phrases have a high meaning, and represent the ideality of magnetism. They imply not merely the directions of force, which are made manifest when a little magnet, or a crystal, or other subject of magnetic action is placed amongst them, but those lines of power which connect and sustain the polarities, and exist as much when there is no magnetic needle or crystal there as when there is; having an independent existence analogous to (though very different in nature from) a ray of light or heat, which, though it be present in a given space, and even occupies time in its transmission, is absolutely insensible to us by any means whilst it remains a ray, and is only made known through its effects when it ceases to exist. The form of a line of magnetic force may vary exceedingly from a straight line to every degree of curvature, and may even have double and complicated curvatures impressed upon it. Its direction is determined by its polarity, the two changing together. Its powers are such, that a magnetic needle placed in it finds its place of rest parallel to it; a crystal of calcareous spar turns until its optic axis is transverse to it; and a wire, which is unaffected when moved in or along it, has an electric current evolved the instant that it passes across it: by these and by other means the presence of the magnetic line of force and its direction are rendered manifest.

The earth is a great magnet; its power, according to Gauss, being equal to that which would be conferred if every cubic yard of it contained six one-pound magnets; the sum of the force therefore is equal to 8,464,000,000,000,000,000,000 such magnets. The disposition of this magnetic force is not regular, nor are there any points on the surface which can be properly called poles: still the regions of polarity are in high north and south latitudes; and these are connected by lines of magnetic force (being the lines of direction) which, generally speaking, rise out of the earth in one (magnetic) hemisphere, and passing in varied directions over the equatorial regions into the other hemisphere, there enter into the earth to complete the known circuit of power. A free needle shows the presence and direction of these lines. In London they issue from the earth at an angle of about 69° with the horizon (being the dip or inclination); and the plane in which they rise forms an angle of 23° W. nearly with true north, giving what is called west declination. Where the dip is small, as at the magnetic equator, these lines scarcely rise out of the earth and pass but a little way above the surface; but where it is large, as in northern or southern latitudes, they rise up at a greater angle, and pass into the distant realms of space, from whence they return again to the earth in the opposite magnetic hemisphere, thus investing the globe with a system of forces like that about an ordinary magnet, which, wherever it passes through the atmosphere, is subject to the changing action of its magnetic oxygen. There is every reason to believe that these lines are *held* in the earth, out of which they arise and by which they are produced, just as the lines which originate in a magnet are held by it, though not in the same degree; and that any disturbance from above affecting them will cause a greater change in their place and direction in the atmosphere and space above than in the earth beneath.

The system of lines of magnetic force around a magnet or the earth is related by a lateral tension of the whole, analogous in some degree to the lateral tension of lines of static electrical force; both the one and the other being easily made manifest by experiment. The disturbance of the tension in one part is accompanied instantly by a disturbance of the tension in every other part; for as the sum of the external powers of a system, unaltered at its origin, is definite and cannot be changed, so any alteration either of intensity or direction amongst the lines of force at one place must be accompanied by a corresponding change at every other. So if a mass of soft iron on the east side of a magnet causes a concentration of the lines of force from the magnet on that side, a corresponding expansion or opening out of the lines on the west side must be and is at the same time produced; or if the sun, on rising in the east, renders all the oxygen of the air on that side of the globe less magnetic and less able therefore to favour the transition of the lines of terrestrial force there, a greater number of them will be determined through the western region; and even though the lines of force may be doubted by some as having a separate existence such as that above assumed, still no error as to the effects on magnetic needles would in that case be introduced, for they by experiment would be and are the same.

The power of a magnetic body as iron or oxygen to favour the transmission of lines of force through it more than other bodies not magnetic, may be expressed by the term *conduction*. Different bodies, as iron, nickel, oxygen, conduct in various degrees, and not only that, but the same body as iron or oxygen conducts in different degrees at different temperatures. When space traversed by uniform lines of magnetic force is occupied by a uniform body as air, the disposition of the lines is not altered; but if a better conducting substance than the air is introduced, so as to occupy part of the space, the lines are concentrated in it, and drawn from other parts as shown by P. P. in the figure, or if a worse conducting substance is introduced, the lines are opened out as at D. D. In both cases the lines of force are inflected, and a small magnetic needle standing in them at the inflected part would have its direction changed accordingly. Experimental illustrations of these changes in direction are given in Mr. Faraday's paper in the *Philosophical Transactions* for 1851, Part I. Par. 2843, &c.



Now this by the hypothesis is assumed to take place in the atmosphere. Supposing it all at mean temperature, the lines of force would have the direction determined by the arrangement of the power within the earth. Then the sun's presence in the east would make all the atmosphere in that region a worse conductor, and cause it to assume the character of D; and as the sun came up to and passed over the meridian and away to the west, the atmosphere under his influence would bring up changes in direction like those shown in either D or D; it would, therefore, manifestly set a needle in a given latitude in opposite directions as it passed by; and as evidently set two needles in north and south latitudes in opposite directions at the same moment of time. As the night came on and a temperature lower than the mean came up from the east and passed over, the lines of force would be inflected as in P or P., and a reverse variation of the needle to that which occurred before would now take place.

That natural effects of variation must be produced consequent upon the magnetic nature of oxygen and its daily variations of temperature is manifest; but whether they cause the observed variations, or are competent to do so, is a question that can only be decided after very careful enquiry. Observations are now made on the surface of the earth with extreme care in many places, and these are collated, and the average or mean result, as to direction and intensity of the earth's force, ascertained for every hour and season; and also many remarkable, anomalous, and extra results evolved. A theory of the causes of any or all of these variations may be examined first by the *direction* which the varying needle does or ought to assume, and then by the *amount* of the variation. The hypothesis now brought forward has been compared with the mean daily variation for all the months in the year at north and south stations, as Toronto and Hobarton, and at many others near to and far from the equator, and agrees in direction with the results observed far beyond what the author anticipated. Thus the paths described by the upper ends of free needles in the north and south hemispheres should be closed curves, with the motion in opposite and certain directions, and so they are:—the curves described by needles in north or south latitudes should be larger in summer and smaller in winter, and so they are—a night or cold action should grow up in the winter months, and such is the case—the northern hemisphere ought to have a certain predominance over the southern, because of its superior temperature, and that is so:—the disposition of land and water ought to have an influence, and there is one in the right direction:—so that in the first statement and examination of the hypothesis it appears to be remarkably supported by the facts. All these coincidences are particularly examined into and stated in the *Philosophical Transactions* already referred to. The next step will be to ascertain what is the amount of change in the conducting power of the air for given changes of temperature, and then to apply that in the endeavour to ascertain whether the amount of change to be expected is (as well as the direction) accordant with that which really occurs.

CHEMICAL SOCIETY OF LONDON.—*May* 19*th.*

ROBERT PORRETT, Esq., *Treasurer*, in the Chair.

ON THE ADULTERATION OF TEA.—Mr. Warington read a valuable communication on the Adulteration of the Teas of Commerce, in which he adduced further confirmation of the views expressed by him in a previous communication to the Society, relative to the composition of the "glaze," or "facing," given to the green tea by the Chinese manufacturer. It appears that the glaze on the surface of certain kinds of green tea is given to it by the manufacturer, not with a view to adulteration, but for the purpose of suiting his foreign customers. This glaze is composed of a mixture of Prussian blue, turmeric, and fibrous gypsum, a small portion of which is sufficient to give the requisite glaze to a large quantity of tea.

There is, however, an extensive adulteration of tea practised in China, not by the desire of the manufacturer, but to meet the price offered by the importers of the tea into England. Some samples of this tea examined by Mr. Warington, were found to consist of powdered tea, sand, and dirt, agglutinated together by means of gum, the black being coloured with plumbago, and the green with the facing above mentioned. On analysis these teas were found to give from 35 to 45 per cent. of ashes on incineration, whilst good tea did not give more than 5 per cent. of ash, the excess in the adulterated specimens being composed of sand, dirt, and other extraneous matter. Upwards of 750,000 pounds of this tea have been imported into this country within eighteen months. The adulteration may be detected from the circumstance, that on the addition of boiling water, there is no opening or unfolding of the leaf as in good tea, the fact being that there is no leaf to unfold. The Chinese call this Lie-tea, and prepare it only to suit the wishes of the importers. Attempts were made to pass these teas at the Custom house as manufactured goods, paying an *ad valorem* duty of 10 per cent. instead of the usual rate of 2*s.* 1*d.* per pound. The name "gum-and-dust" is given by the trade to the tea with which this fraudulent article has been mixed.

It would appear that the difference between green and black tea, as far as regards their physical and chemical condition, arises from the fact, that the latter in its preparation is made to undergo a species of fermentation and oxidation previous to being roasted.

REVIEW.

PHARMACOPŒIA COLLEGII REGALIS MEDICORUM LONDINENSIS. MDCCCLI.

(*Continued from page* 574).

In resuming our notice of the new London Pharmacopœia, we take this opportunity of observing, that we do not pretend in the present article to give more than a very brief outline of the changes introduced. Some of these changes must be tested by practical experience before a positive opinion respecting them can be given, others demand a more detailed notice than would be in accordance with the limits of a review, and we therefore intend to give separate articles on such subjects as appear to require special comment. Some of our correspondents have already favoured us with remarks on several of the preparations; and we are glad to receive such contributions, as it is our object to draw the attention of our readers to the points which appear most deserving of notice, rather than to absorb all the criticism in an editorial article. The Pharmacopœia embraces a wide field of research, and as its compilation has occupied about six years, it is not too much to expect that it will furnish materials for discussion for as many months.

In liquor aluminis compositus distilled water is ordered instead of boiling water.

Liquor sodæ is substituted for liquor potassæ in the preparation of antimonii oxysulphuretum, a change which will not affect the composition of the product, and which has no doubt been made because soda is cheaper than potash, and is therefore always used by the manufacturer.

A new process is given for the preparation of antimonii potassio-tartras. The process in the old Pharmacopœia was not a good one, and this is decidedly an improvement upon it. Vinum antimonii potassio-tartratis remains unaltered, but in making it the antimonial salt is directed to be used in crystals, in which state it is less likely to be impure than when in powder.

Liquor arsenici chloridi is introduced. This is the preparation long known at Apothecaries' Hall as Solutio solventis mineralis, or De Valangin's solution (*see* vol. viii., p. 395). The process however is much simplified.

The preparations of silver are omitted, except the nitrate, which is transferred to the Materia Medica. We are surprised at the omission of the oxide of silver, which has for several years been much in demand.

Chloride of barium and its solution are omitted among the preparations and enumerated with the other tests in the Appendix. Creta præparata, calx, calx chlorinata, and calcii chloridum, are transferred to the Materia Medica : the solution of the latter is omitted. Liquor chlorinii is introduced among the tests.

Cupri sulphas is added to the preparations, and is ordered to be prepared by dissolving and recrystallizing the "cupri sulphas venalis," which is included in the Materia Medica. Ferri sulphas is ordered to be purified in a similar manner, with the addition of iron wire to the solution. Three preparations of iron are introduced, namely, ferri ammonio citras, ferri carbonas cum saccharo, and syrupus ferri iodidi. These are all valuable preparations, the introduction of which, has, we think, been rightly judged. The formula for the first two are unobjectionable; that for the last is defective in as much as the quantity of water ordered is greater than is required, so that the solution has to be evaporated to the detriment of the product. An improved process is given for ferri potassio-tartras, and vinum ferri is introduced.

The two oxides, the bicyanide and biniodide of mercury, are omitted. The other preparations of this metal, including the nitric oxide, are retained. For practical purposes the necessity of retaining some of these formulæ may be doubted, as mercurials are not a class of preparations which the Apothecary or Dispensing Chemist would make for his own use.

Several preparations of lead are omitted or transferred to the list of Materia Medica. In plumbi iodidum the proportion of acetate of lead is diminished, and made more nearly equivalent to the iodide of potassium.

From the preparations of potassium, liquor potassæ effervescens, potassæ bisulphas, and potassii bromidum are very properly omitted.

Among the preparations of sodium, liquor sodæ is introduced, the process for its preparation being similar to that for liquor potassæ, for which it is substituted in some of the formulæ. Sodæ carbonas and sodæ bicarbonas are transferred from the processes to the Materia Medica, and in the latter the name bicarbonate is substituted for the incorrect name sesquicarbonate previously adopted. Sodæsulphas and sodæ potassio-tartras are also transferred to the Materia Medica, and liquor sodæ effervescens is omitted.

In the place of zinci sulphas, which now appears among the Materia Medica, is substituted a process for zinci chloridum, the preparation of which the Chemist is more likely to undertake.

Among the mixtures, Mistura assafœtidæ, M. moschi, and M. cascarillæ are very properly omitted. In M. acaciæ distilled water is ordered instead of common boiling water.

The essential oils are transferred to the Materia Medica.

The principal alteration in the formulæ for pill masses consists in the substitution of soft soap for hard. This may be an improvement in a few cases; for example, in pills which it is desirable to retain in a soft state. In other cases the change is for the worse. Hard soap is preferable in pilula saponis composita, and also in pills which from their resinous character are liable to adhere together or lose their shape. Some of our correspondents have inquired where sapo mollis is to be obtained. This question will soon be answered—as the demand is sure to create a supply;

meanwhile, the process for preparing it is described at page 612. Treacle is also in several cases substituted for gum or syrup, as for instance, in pilula conii composita, pilula galbani composita, pilula ipecacuanhæ cum scillâ (a new name for pilulæ ipecacuanhæ compositæ), pilula rhei composita, and pilula scillæ composita. Pilula aloes cum sapone is introduced for the first time. It is the pill known for many years as pilula aloes diluta. Pilula colocynthidis composita has already been referred to in connection with the extracts. Pilulæ hydrargyri iodidi, and pilulæ sagapeni compositæ are omitted.

The powders remain unaltered.

Alcohol is omitted, as also are spiritus ammoniæ, and spiritus lavandulæ. Spiritus menthæ pulegii is changed to spiritus pulegii. The most important alteration in these preparations, however, is the use of essential oils, which are simply dissolved in the spirit without distillation, instead of being distilled from the seeds or fruits. This alteration is made in spiritus anisi, spiritus carui, spiritus juniperi compositus, spiritus myristicæ, and spiritus pimentæ, and we think it is an alteration for the worse, as the oils become oxidized from long exposure to the air, and while they thus lose much of their fragrance, they acquire at the same time a resinous character.

A process is given for the preparation of iodide of sulphur, which is unobjectionable. The compound is a diniodide.

In the preparation of syrups a novelty is introduced, which consists in the addition, in most instances, of a portion of rectified spirit, the object of which is, we presume, to counteract fermentation or other decomposition. We shall be curious to watch the effect of this alteration. In the process for simple syrup the proportion of sugar is reduced. It was previously too great, the error having probably arisen from confounding the troy and avoirdupois ounces. In the old process ten pounds of sugar (120 ounces Troy) was directed to be dissolved in three pints of water (60 ounces avoirdupois.) Now good cane-sugar is only soluble at the common temperature of the air to the extent of two parts to one of water, and as the quantity of sugar ordered was greater than this to the extent to which the troy ounce exceeds the avoirdupois ounce, the syrup made in those proportions was constantly liable to deposit sugar. In the new process, three pounds of sugar (36 ounces Troy, or 39½ ounces avoirdupois) is directed to be added to one pint (20 ounces avoirdupois) of water, in which proportions the syrup would be just below its point of saturation at common temperature, which is as it ought to be. Two new syrups are introduced, namely, syrupus cocci and syrupus violæ. The former of these is objectionable, as it is likely to be mistaken in prescriptions for syrupus croci. It is useless except for colouring, for which syrupus rhœados is quite as good.

Of the tinctures two are omitted, namely, tinctura cardamomi and tinctura guaiaci, and several new ones are introduced, namely, tinctura aconiti, T. belladonnæ, T. cinchonæ pallidæ, T. ergotæ ætherea, T. limonum, T. lobeliæ, T. lobeliæ ætherea, T. quinæ composita. With reference to the last we find that the quinine is not perfectly soluble to the extent ordered in the tincture of orange-peel.

The instructions for the purification of gum-resins are given more specifically than they were in the preceding Pharmacopœia, and in the purified state the term "*præparata*" is appended to the name, as for instance, *Assafœtida præparata.* In connexion with the purification of gum-resins, instructions are also given for separating the pulp from cassia fistula, prunes, and tamarinds, and the names cassia præparata, prunum præparatum, tamarindus præparatus, are applied to the prepared pulps.

The wines are unaltered, excepting, as already noticed, in the cases of vinum antimonii potassio tartratis, and vinum ferri.

Of the ointments two are omitted—unguentum hydrargyri mitius and unguentum hydrargyri biniodidi; and six are introduced—unguentum belladonnæ, U. conii, U. hydrargyri nitratis mitius, U. opii, U. potassii iodidi and U. sulphuris iodidi.

Unguentum hyd. nit. mitius should not be kept ready made but mixed when wanted, as the ointment speedily changes colour when diluted.

OBITUARY.

The name of Richard Phillips has been for so many years associated with Pharmaceutical science and literature, that his decease will be generally felt to be a serious loss to the profession. He died on Sunday, the 11th of May, in his 75th year.

Mr. Phillips was in early life a Chemist and Druggist. He was always attached to science, and was one of the founders of the Geological Society. The Transactions of the Royal Society, of which he was a very old member, contain many papers on chemical subjects from his pen.

In 1821 he became the Editor of the Annals of Philosophy; and was from about that period one of the Editors of the Philosophical Magazine. He was appointed Lecturer on Chemistry to the London Hospital in 1817; and in 1832 he received a similar appointment at St. Thomas's Hospital. He was connected with the Museum of Practical Geology, in the official capacity of Chemist, from the origin of that institution.

It is, however, in the character of Editor and translator of the Pharmacopœia that the name of Richard Phillips is most familiar to our readers, and on this portion of his labours will rest a large share of his posthumous fame. In 1816 he produced a review (150 pages) entitled "An Experimental Examination of the last edition of the Pharmacopœia Londinensis, with Remarks on Dr. Powell's Translation and Annotations." This work established his reputation as a critic, and raised his character as a Chemist. Though his satire was pungent his remarks were accurate, and his suggestions practically judicious. The work which had come under his lash afforded ample material for criticism, and he took full advantage of the opportunity. In 1816 he brought out another *brochure*, entitled "Remarks on the Edito Altera of the Pharmacopœia Londinensis, and on Dr. Powell's Translation and Annotations," in which he pointed out the inconsistencies between the two editions, and the defects existing in the one, which had been intended as a complete correction of its predecessor. The ability and practical skill evinced by Mr. Phillips in these publications were appreciated by the College; and in 1824 he produced his first official translation of the Pharmacopœia Londinensis. Up to the present time he has enjoyed the reputation of being the official Editor and translator; and although he did not retain the former character, in the case of the edition recently published, he had at the time of his decease, made considerable progress in preparing a translation which was expected shortly to appear.

The second and third volumes of this Journal contain a series of articles by Mr. Phillips, entitled "Illustrations of the State of Pharmacy in England," in which are reported the examinations of a variety of drugs and chemicals obtained at various establishments, chiefly in the metropolis. In these articles the characteristic satire of the author was prominent; and as he scrupulously avoided personalities, the criticism directed attention to defects and oversights without giving offence.

Until within a few days of his decease, Mr. Phillips was in the enjoyment of usual health, and was actively assisting in the preparations for the opening of the Museum of Practical Geology, which has been removed from Charing Cross to Jermyn Street. He died the day before the occurrence of this event.

TO CORRESPONDENTS.

Ferrum (Blackburn).—The following is the formula for hydrated peroxide of iron (Edin. Ph. 1841):—℞ Sulphate of iron ℥iv.; Sulphuric acid (commercial) fʒiiiss.; Nitric acid (D. 1380) fʒix.; Stronger aqua ammoniæ f℥iiiss.; Water Oij.
Dissolve the sulphate in the water, add the sulphuric acid, and boil the solution; add then the nitric acid in small portions, boiling the liquid for a minute or two after each addition, until it acquires a yellowish-brown colour, and yields a precipitate of the same colour with ammonia. Filter; allow the liquid to cool; and add in a full stream the liquid ammonia, stirring the mixture briskly.

Æsculapius (Donnington).—(Lucifer-matches). See vol. iii., p. 352.

Veratrum.—(1.) No.—(2.) No.

Ferventis will see in the new Pharmacopœia the time is altered to seven days, which is quite sufficient.

T. M. O. (Derby).—Butyric ether is used for flavouring confectionery under the name of essence of pear.

J. O. Davis (Folkestone).—Yes; it yields white precipitates (tannates).

Fid.—Sulphuric acid is the usual test for cod-liver oil, producing a beautiful violet colour. (See vol. viii., pages 370, 242).

A Member.—Dana's *Mineralogy*, Noad's *Electricity*, De la Beche's *Outlines of Geology.*

R. A. P. S. (Canterbury), is on the wrong tack, and should consult Graham's *Elements of Chemistry*, or some work of that kind. In graduating a thermometer, the two starting points are the melting point of ice and the boiling point of water.

Mr. Barber suggests Sp. Hartshorn as a test to distinguish olive oil from seed oil. He says, if the olive oil be pure, a tolerably good emulsion is formed, which separates in some degree, but if it contain seed oil, a much better emulsion is the result, and if it be much adulterated, the liniment will, after standing a week or two, become almost solid.

Crystalized Pyretics, or Vital Electric Salts.—Mr. Lamplough complains of a casual remark in our last number respecting this salt, and says it is not, as we suspected, ammonio-phosphate of soda; but he does not say what it is. We are obliged to insert his letter on the cover, as we could not otherwise have published it. It should be stated that, in using the expression "a fictitious name," we did not intend to cast any reflection on the veracity of Mr. Lamplough, or on the merits of the salt. The sense in which the term was applied may be made more evident by stating a parallel case, also in the Exhibition—the name "Esculapian Elixir" is given to a preparation of sarsaparilla. This may be a good preparation, or it may not, but the name is fictitious, and confers on it the character of a quack medicine.

Mr. Jennings has sent a communication on the subject of the Arsenic Bill, which he thinks in some respects too stringent, amounting almost to a prohibition of the sale of arsenic for poisoning vermin. The verbal alterations in the Bill will meet some of the objections. Any prohibitory Bill of this kind must be attended with a certain amount of inconvenience.

Several articles are, for want of space, deferred until next month, among which is a notice of several reports on the Chemical examination of water supplied, or proposed to be supplied, to the metropolis, with observations on the Bill now before the House of Commons for regulating the water supply.

ERRATUM.—Page 524 (Opium) *for* 1838, *read* 1828.

Instructions from Members and Associates, respecting the transmission of the Journal, to Mr. SMITH, 17, Bloomsbury Square, before the 20th of the month.

Advertisements to Mr. CHURCHILL, Princes Street, Soho.

Other Communications to the EDITOR.

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